TECHNOLOGY DEPT.

November 1953

Telephone and Management Engineer

THE NATIONAL TELEPHONE MAGAZINE

Featuring In This Issue—

- Cable Plant Construction, by John S. Reed
- Bread and Butter Economics, by T. A. Saunders
- Small Company Talk, by Bill Corman
- "Questions and Answers," by Jay G. Mitchell

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TELEPHONE ENGINEER & MANAGEMENT

The National Telephone Magazine • Vol. 57, No. 11, November, 1953

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Feature Articles

- **Editorial — "The Significance of the 50,000,000th Telephone"** 41
  The telephone has become an integral part of the everyday life of the people.
- **Bread and Butter Economics** ..... T. A. Saunders 47
  Your "bread" will have much more "butter" on it if your customers are getting good service and are willing to pay for it.
- **Cable Plant Construction (Part One)** ..... John S. Reed 50
  In Part One of TE&M's new training course, Mr. Reed discusses — (1) Cable Plant vs. Open Wire plant; (2) Cable Design; (3) The House Count Map, and (4) Cable Laterals and Terminals.
- **Small Company Talk** ..... Bill Corman 62
  Rural carrier promises to reduce the high cost of providing rural service.

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FRONT COVER: Board of Directors of Rocky Mountain Telephone Assoc. Left to right seated: Vincent Chiodo, Trementon, Utah; D. A. McClean, Denver, Colo.; C. W. Haas, BigTimber, Mont.; Mills Roberts, Memphis, Tex.; T. Clark Callister, Fillmore, Utah; J. W. Corbin, Moab, Utah; J. W. Baker, Coeur d'Alene, Ida. Left to right, standing: George Stoner, Lincoln, Mont.; Floyd Reyher, Haxtun, Colo.; J. F. Thiele, Pagosa Springs, Colo.; J. F. Monsen, Aberdeen, Ida.; R. A. Manuel, Browning, Mont. Directors not present in picture: Ward Bladzard, Kamas, Utah; J. E. Tipton, Espanola, N. M.; Harry Bean, Cascade, Ida.; Osborne Low, Afton, Wyo.

INDEPENDENT TELEPHONES SERVE 2/3 USArea

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Subscriber and Trunk

FM the proven system for noise-free transmission

- Constant audio output over varying transmission losses. Toll quality up to 55 db line loss without pilot channel control.
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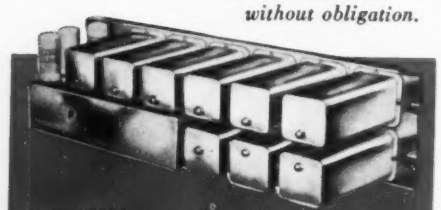

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Utilities, Massachusetts, U.S.A.

Mostly About People—

Across The Editor's Desk

NEW TRAINING COURSE

"CABLE PLANT CONSTRUCTION" Part One, starts on page 50 of this issue. The author *John S. Reed* has prepared questions for students of the Course. A set of questions will accompany each installment unless its length makes it necessary to run it in two or more sections. A number of telephone companies have entered group subscriptions for their employes and will use the articles as a study course. If you wish to enroll and are not a paid subscriber of TELEPHONE ENGINEER & MANAGEMENT turn to page 100 and fill out subscription blank to insure your receiving your personal copies of the course. If you receive FORTNIGHTLY TELEPHONE ENGINEER and do not receive the magazine mentioned above it will be necessary that you subscribe.

CONVENTION WINNER

OUR FRIEND *Frank Thilges*, representative of the *C & D Batteries, Inc., Conshohocken, Penna.*, has announced the door prize award from the C & D exhibit at the national convention last month. *O. K. Cook, Peninsular Telephone Co., St. Petersburg, Fla.* was the winner and recipient of a handsome Deep-Fryer.

COUNTESS SELECTED

THIS IS PROVING to be a busy year for *H. D. Thompson, manager of the Cumming County Independent Telephone Co., Wisner, Neb.* In addition to being elected President of the Nebraska Telephone Association, Mr. Thompson reports with pride that his daughter, *Evelyn Ann Thompson*, was selected to be one of the Countesses in the annual Coronation and Ball of the Ak-Sar-Ben Society in Omaha. Miss Thompson is a student at Norfolk Junior College.

The Ak-Sar-Ben Society is comprised of prominent men throughout the State of Nebraska. At this annual affair the Ak-Sar-Ben crowns their King and Royal Consort, bestowing upon them honors which come as a recognition for outstanding contributions to the development of their community.

HONORS FOR PFAENDER

FRED PFAENDER, the grand gentleman of Minnesota Independent telephony, New Ulm, Minn. on October 8 became a nonagenarian (90 in our book). That day he was kept busy receiving congratulatory messages from friends, business associates and his family. The New Ulm Review devoted an Editorial congratulating him and outlining his various and many activities. His civic services to his community and to its well being took many words. So full is *Fred Pfaender* living, retirement has no place in his activities.

PROGRESS AT ANANADALE

BILL AND THELMA SALTMARSH of the Lakedale Telephone Co., Ananadale, Minn. reported progress on their newly acquired exchanges when he ordered several extra subscriptions for our Training Course mentioned in the opening paragraph. The Saltmarshes have given freely of their time to the telephone industry and to many of the surrounding state telephone associations. We hope one of them will appear on one the 1954 programs.

C. W. CHEENEY RECUPERATES

FRIENDS OF *Charles W. Cheeney*, Chesaning, Mich. will be pleased to know he is convalescing nicely at Passavant Memorial Hospital following his illness during the USITA national convention. The Cheeneys hope to be home by the time this item appears in print. Mr. and Mrs. Cheeney have attended the telephone conventions for many years.

Serving 5,950 stations...HARRISONBURG TELEPHONE COMPANY and

Exide-Manchex

BATTERIES

On March 28, 1953, the Harrisonburg Telephone Company, which is located in the heart of the Shenandoah Valley of Virginia, put into operation its new dial office. The exchange has 3000 lines, with 5950 stations installed, and provides for future expansion. Also installed are two 26-cell FME-25 Exide-Manchex batteries in parallel that operate the automatic dial equipment and provide 24 volts through CEMF counter cells for PBX operation.

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POSITIVE OPERATION: Dependable performance for all telephone battery requirements—central office and private exchange equipment.

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GREATER CAPACITY in a given amount of space avoids overcrowding of equipment.

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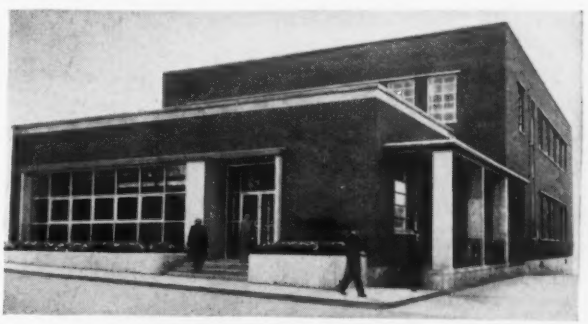
Various sizes and types of Exide Batteries are available in plastic containers.



The Harrisonburg Telephone Company's modern and efficient dial exchange.

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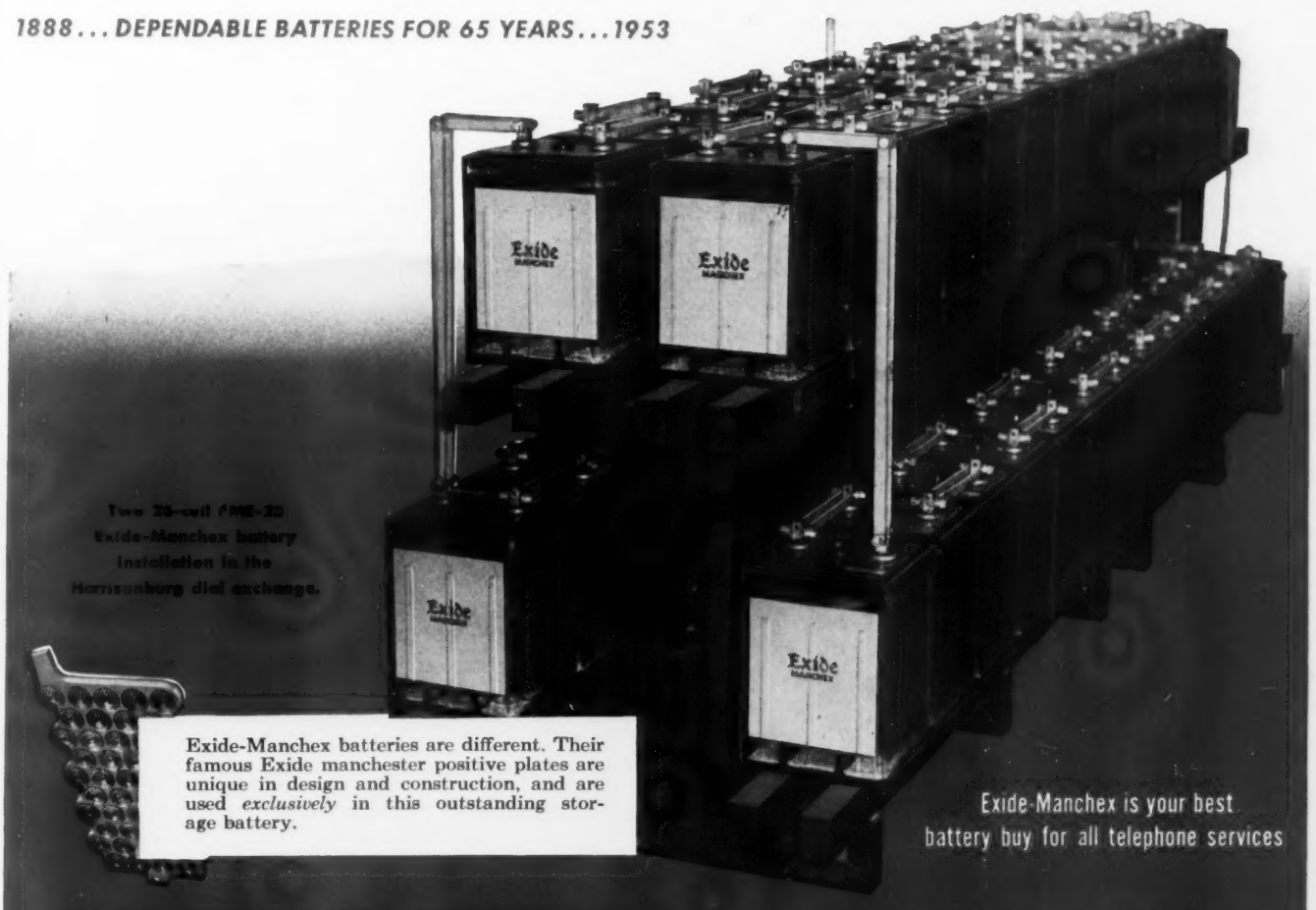

Two 26-cell FME-25 Exide-Manchex battery installation in the Harrisonburg dial exchange.

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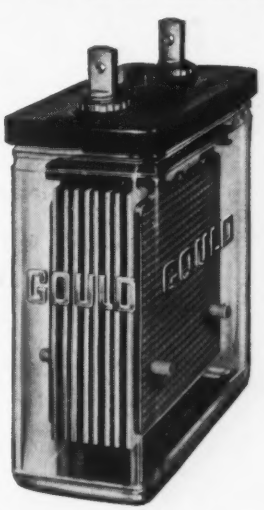

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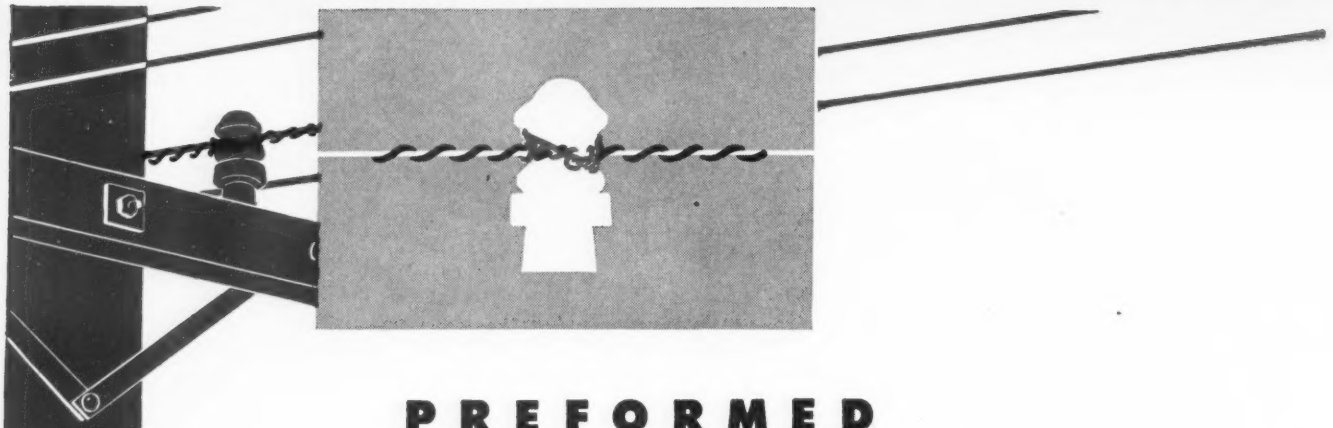

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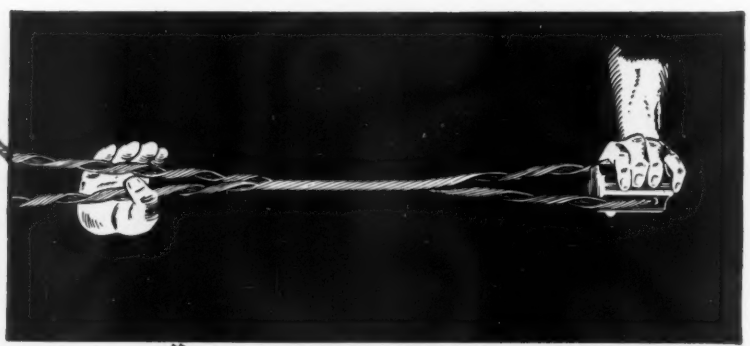

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PREFORMED "GUY-GRIPS" assure the fastest, most economical and most efficient means of dead-ending guys • Eliminate the need for clamps • Save about half the steel strand usually required • CAN BE INSTALLED BY HAND • Will not slip • No retightening is ever necessary • Are stronger than strand itself.

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NEWSLETTER
TELEPHONE ENGINEER

Fortnightly TELEPHONE ENGINEER ★ TELEPHONE ENGINEER AND *Management*

ON THE 1st OF EACH MONTH ON THE 15th OF EACH MONTH

NEWSLETTERS *on Alternate Weeks*

November 15, 1953

Dear Sir:

Profits, "and not policing," accounts for progress & initiative of United States' utilities, & "fact that many foreign governments own & operate their telephone industry may account for their substantial lack of telephone service," as compared to US, FCC Commissioner John C. Doerfer said recently. Addressing National Conference of Business Paper Editors, Commissioner Doerfer reiterated views he expressed in his separate concurring opinion in FCC action granting Bell System companies higher interstate long-distance telephone rates.

"In my opinion," he declared, "It is the plain duty of a commission to approve a rate increase as well as a decrease when the facts warrant it – and to do so promptly. Excessive regulatory lags should be avoided whenever possible. Generally, they are inconsistent with the best public interest. In this dynamic economy of our country, the American public is more interested in improving the service at reasonable rates than suffering a deterioration of service, or even maintaining the status quo."

* * *

New booklet tracing history of electronics industry from "Benjamin Franklin's kite flying days to the present age of electronically controlled rockets" has been published under sponsorship of Radio-Electronics-Television Manufacturers Association, (RETMA). Booklet titled "The Kite and the Key," will be distributed in limited quantities to interested parties through RETMA headquarters, 777 14th St., N. W., Washington 5, D. C.

* * *

FCC's Telephone Committee ok'd plans of Southern Bell Tel. & Tel. Co. & Carolina Tel. & Tel. Co. for $2,500,000 toll cable construction project to relieve overloaded communications circuits from Charlotte, N. C., to south central and eastern North Carolina & northeastern South Carolina. Project will result in increase of 14 voice frequency circuits & 120 cable carrier circuits over 139-mile route between Charlotte & Fayetteville, N. C., & will furnish 590 channel miles of voice frequency telephone circuits & 11,400 channel miles of telephone carrier.

* * *

FCC publication "Statistics of the Communications Industry of the United States," for calendar year 1951, is now available from Superintendent of Documents, Government Printing Office, Washington 25, D. C.,

for 40 cents per copy. Report contains financial & operating data compiled chiefly from annual reports filed with FCC by telephone, telegraph, & cable carriers.

* * *

West Newton (Ind.) Tel. Co., wholly-owned subsidiary of Indiana Bell Tel. Co. since its acquistion in 1946, received authority from FCC to liquidate & merge into Indiana Bell. West Newton company, with depreciated assets of approximately $90,000, is serving about 300 telephones.

At same time, Indiana Bell & another wholly-owned subsidiary, Noblesville (Ind.) Tel. Co., filed with FCC for certificate that merger of Noblesville company into Indiana Bell would be in public interest.

* * *

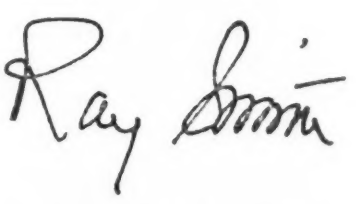
$29,000,000 construction program for 1954, providing for 2,000,000 miles of telephone channels & extensive additions in audio facilities for television, has been submitted to FCC by American Tel. & Tel. Long Lines Department & 13 Bell System Associated companies. Long Lines said that construction, which will provide new telephone plant in every state of union except South Dakota, will represent about 1/4 of its program for 1954.

* * *

Birmingham, Mich., will become 2nd community in United States to get customer toll dialing when, on Nov. 20, city is tied in with Bell System's toll dialing network to make it possible for Birmingham customers to dial more than 13,000,000 telephonesin 14 metropolitan areas throughout country.

* * *

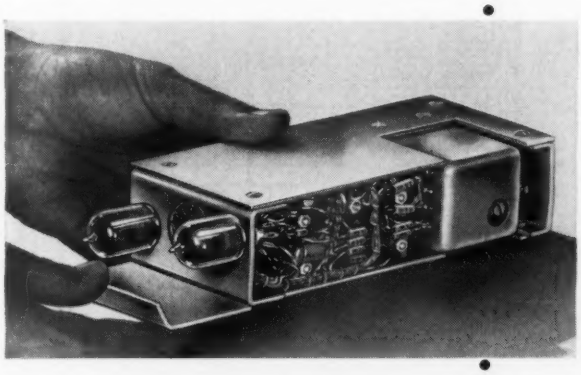
Highlights: – Olney (Ill.) exchange of General Tel. Co. of Ill. converted to automatic operation . . . Ark. Valley (Kans.) Tel. Co-op. has option to purchase Sterling (Kans.) Tel. Co. Co-op is awaiting allocation of REA funds . . . Prairie Center (S. D.) Community Tel. Co. rebuilding plant . . . Prairie Grove (Ark.) Tel .Co. constructing new building to house dial system . . . Forbes (Minn.) Rural Tel. Co. voted to sell properties to Northwestern Bell Tel. Co. R. J. Gunning, mgr. of North Central Tel. Co., announced plans for conversion of Clare, Duncome, Thor & Vincent, La., exchanges. Modernization program will cost $300,000 . . . Stayton (Ore.) Mutual Tel. Co. completed cable project . . . General Tel. Co. of Ky. announced conversion of Grayson (Ky.) exchange . . . Leland Archer, Densmore, Kans., has been elected pres. of board of directors of Rural Tel. Service Co., Norton, Kansas. . . . Golden Belt Tel. Assoc., LaCrosse, Kans., aplied for REA loan. Co-op proposes to serve communities of Albert, Alexander, Nekoma, Rozel, Rush Center, & Timken, all in Kans.



Ray W. Smith, Editor

REDUCE NOISE AND CROSSTALK AS MUCH AS 22 DB

WITH **LENKURT** COMPANDOR



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COMPANDOR

Flexibility—*Built-in strapping terminals permit operation at −16 and +7DBM, −13 and +4DBM or −4 and +4DBM. No internal adjustment needed.*

Miniature size—*Mounts on standard rack. Total depth, 10 inches. 4-unit shelf occupies 3½ inches vertical space. Plug-in assembly.*

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This reduction of noise and crosstalk can be put to work for you for approximately $600.00 a circuit—voice, carrier or radio. These striking savings merit your immediate investigation. Write today for further details in Bulletin 5090-A P4!

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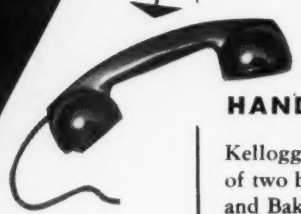

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Kellogg's famous handsets are of two basic types—metal housing and Bakelite housing. Both have the special Kellogg Non-Positional transmitter and bi-polar type receivers using cobalt magnets. Furnished with cords attached.

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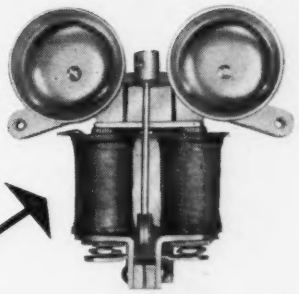

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High impedance—for each of the frequency Selective Series, Harmonic, Synchromonic and Decimonic. Reduces excessive current drain on short loops. Improves ringing on long heavily loaded loops.

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Long lasting, efficient, reliable, Kellogg *Masterphones* have long been established as the finest telephone instruments produced. Your subscribers will appreciate their sturdy, clean-cut appearance—their perfection of performance. And you will benefit from their basic economy, low cost maintenance and operational superiority.

Kellogg supplies Masterphones in common battery, dial, or magneto type for wall or desk installations.

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Compact, attractive. Used to switch a telephone between two incoming trunk lines and to hold one line while using the other for intercommunications. No auxiliary equipment required. Sturdy black Bakelite cover.

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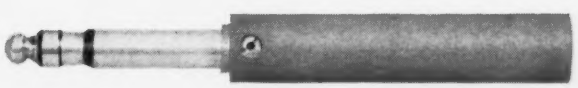
For all types of instruments. Noted for high efficiency, good looks and simplicity. Furnished with various types of number plates. Quiet in operation. Precision built to highest standards. Long lasting and economical!



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Diamond Wire & Cable Company
The Electric Storage Battery Company
Everstick Anchor Company
General Insulated Wire Works, Inc.
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Indiana Steel & Wire Company
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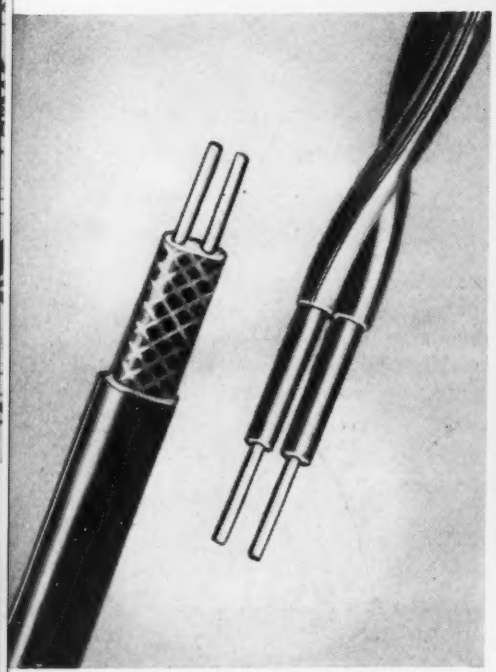

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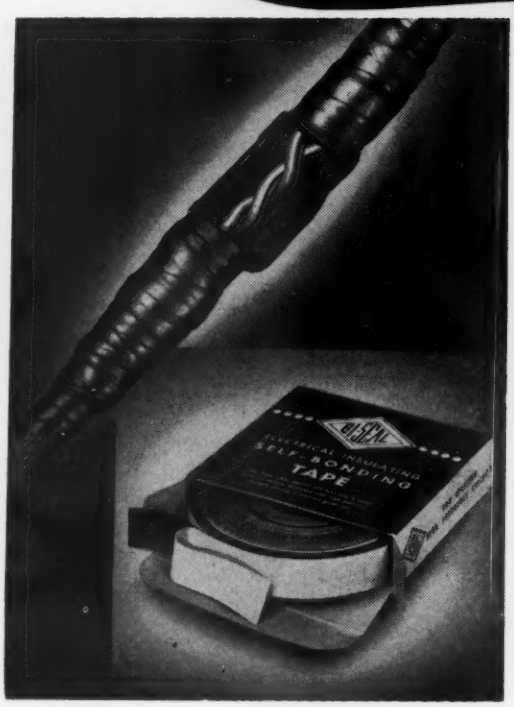

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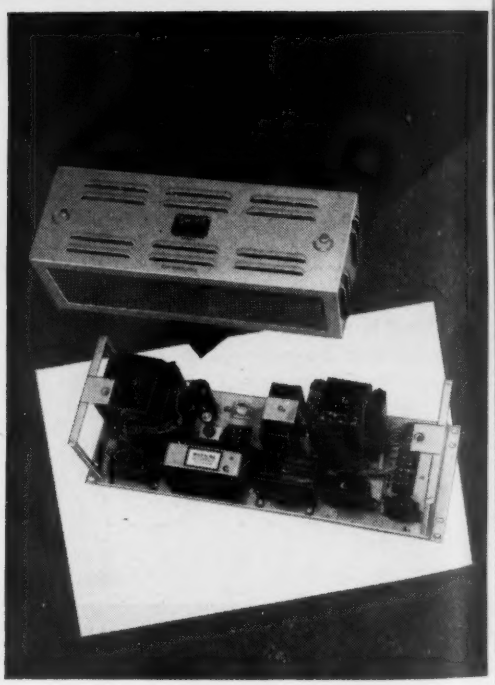
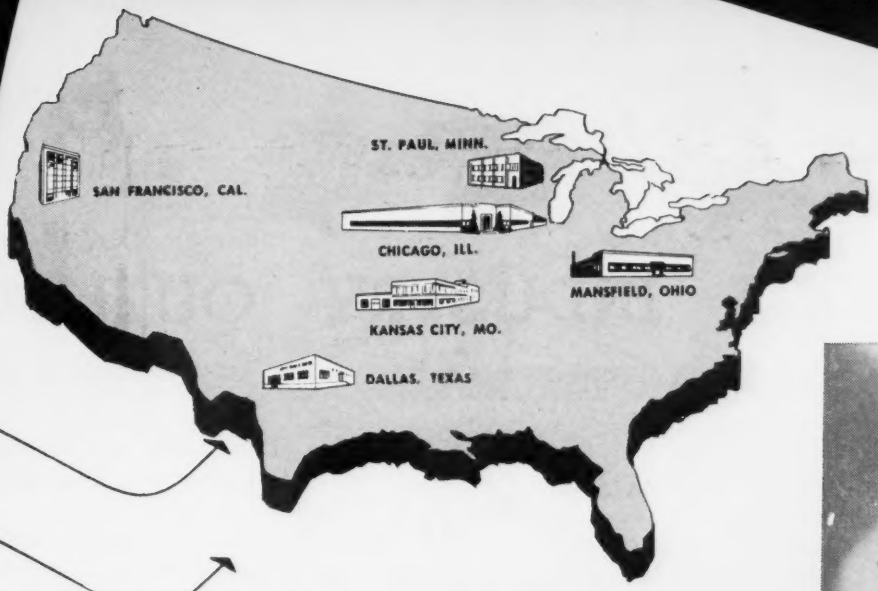


Brings to Telephony the Finest and Most Dependable Ringing Generator! Outstanding features of "BC" Sub-Cycle—instant starting, regulated voltage, fixed frequency output, and DC path for superimposed ringing. Made by LORAIN PRODUCTS CORPORATION.



Send Your Next Order For Supplies to

KELLOGG — DIVISION OF IT&T

KELLOGG SWITCHBOARD AND SUPPLY COMPANY

A Division of International Telephone and Telegraph Corporation

GENERAL SALES OFFICES: 79 W. MONROE ST., CHICAGO 3, ILL.

BRANCH OFFICES: 406 South Main Street, LOS ANGELES 13, CALIF. — 720 S. W. Washington St., PORTLAND 5, OREGON

BRANCH WAREHOUSES AND OFFICES:

5000 W. 51st Street
CHICAGO 38, ILLINOIS

1555 W. 4th Street
MANSFIELD, OHIO

4501 Truman Road
KANSAS CITY 1, MISSOURI

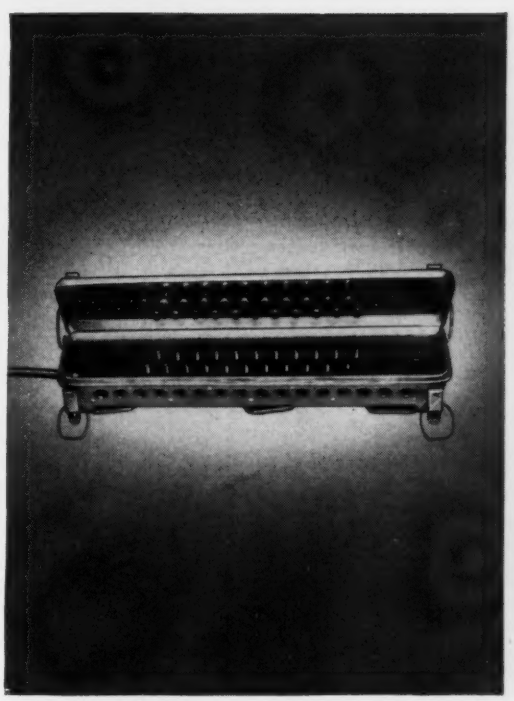
1663 Mission Street
SAN FRANCISCO 3, CALIF.

410 No. Syndicate Ave.
"Midway Area"
ST. PAUL, MINNESOTA

1515 Turtle Creek Blvd.
DALLAS 2, TEXAS

The Expanding Plates and Spreader Arms of Ev erstick Anchors insure 100% safety an maximum holding power under excessiv strain. Ribbed base plate allows anchor t be locked solidly on rod. Quickly installed Made by EVERSTICK ANCHOR CO.

For Use with Cable Spinners, is Crapo Galvanized Steel Lashing Wire. Heavily-galvanized; .091″ diameter, comes in 325-ft. coils. "Stainless-Steel" Lashing Wire is also available in .045″ and 0.65″ diameters. INDIANA STEEL & WIRE COMPANY.



The New Stranterm is the only Strand Mounted Terminal which permits the installer to apply protection to the pairs requiring dischargers, or to install the same terminal unprotected as determined by the outside plant engineers. Compact, easy to install. Made by COOK ELECTRIC CO.

Reliable-Economical! "Eveready" "Columb "Gray Label" telephone dry cells give y dependability, plus economy thru high sustained voltage and extra service l NATIONAL CARBON COMPANY, a D vision of Union Carbide and Carbon Co

TELEPHONE INDUSTRY OUTLOOK

RECESSION FORECASTERS

. . . the head of the American Stock Exchange has taken issue with forecasts of a business recession.

Speaking before the Executives' Club of Chicago last month, Edward T. McCormick, exchange president, said he disagreed with the growing number of pessimists who have come to the conclusion that our economy is skidding and that a severe reaction or a depression is in prospect.

While there may be "shakeouts from time to time and periods of rolling adjustment," he told the Executives' Club, he feels that "long-range prospects are fundamentally sound."

However, he said tax revisions were necessary for a healthy atmosphere for business. The market president declared the expected 10 per cent cut in personal income taxes and the end of the excess profits tax Dec. 31, together with a drop in corporate income tax from 52 per cent to 47 per cent in April, should help.

These measures plus relief from "the double tax on corporate dividends" and "a more equitable capital gains program," he continued, would go far toward leveling off ruts in the business road and accelerating long-range prosperity.

Mr. McCormick called for "a shift from our almost complete reliance on income taxes of various types not only to stimulate business, but to free the Government from its practically complete reliance on this dangerously fluid and fluctuating source of revenue."

He said that of tax proposals being considered in the event of reduction or revenue from present sources, "the suggestion making the most sense is the adoption of a manufacturers' sales tax on all manufactured goods except food and food products at a low percentage flat rate."

COMMUNITY RELATIONS

. . . telephone company executives who are interested in learning more about community relations can obtain a real helper by writing the Department of Public Relations, General Motors Corp., Detroit, Mich., for a copy of "GM Lives Here — How General Motors People Can Build Better Community Relations."

GM has printed about 25,000 copies for circulation among its own executive groups. In addition, there are a limited number available for outside distribution.

A part of the 32-page booklet is devoted to a recital of some of the community relations jobs accomplished by GM executives. These are offered as "thought starters" elsewhere.

Chapters devoted to the "interpretation of the doing" include down-to-earth discussions of good press relationships, and the value of plant visits and other methods of bringing a company before the public.

ANNUAL PAY DEMAND

. . . may be in offing. In fact, annual wages for the factory worker as well as the white collar man could be the next big — and possibly bitter — battle in the labor field.

In previous years, with the economy on the upgrade, labor negotiators asked for the guaranteed annual wage, but they settled for wage increases instead. Now they are more nervous about layoffs.

But if it thinks a slump is coming, management naturally is going to be just that less willing to commit itself to paying for a year's work if the work may not be done.

Walter Reuther has given notice that he'll ask for a guaranteed annual wage for his CIO United Auto Workers.

"When a company has to pay a guaranteed annual wage," he argues, "it will do something about stopping layoffs." He sees production falling and layoffs the order of the day "if the purchasing power of the people isn't increased."

Management has its stake in steady production, too. Full production schedules every working day make for complete and efficient use of a company's facilities, as the American Institute of Management, of New York, points out. It holds: "Unemployment and uncertainty are factors too large for managements interested in survival to take lightly any longer."

The institute sees both advantages and disadvantages in an annual wage for production workers.

PER CAPITA INCOME

. . . for the country as a whole, per capita income in 1952 amounted to $1,639 — up 4 per cent over 1951. Increases occurred in all regions, ranging from 2 per cent in New England to 6 per cent in the Far West.

The accompanying map shows per capita income payments in each State in 1952. The range was from $2,260 in Delaware, nearly two-fifths above the national average, to $818 in Mississippi, only half the

Please Turn To Page 20

Is Her Name "Miss Advertising?"

Your directory advertising may be out of step, if the size of your directory fails to reflect the growth of your service area. More and more managers report that directory advertising can be built to the point of being an important source of increased revenue. You are invited to find out how to increase your directory advertising and receive public relations benefits. There's no obligation on your part. Just call Loomis.

KNOW-HOW TO SOLVE YOUR DIRECTORY PROBLEMS

• 724 cities and towns in 22 states are served by the 287 directories that retain Loomis services.

LOOMIS
ADVERTISING COMPANY

"Where to Call"

FT. WAYNE, IND.
229 E. Berry St. . . . EAstbrook 3477

ST. LOUIS, MO.
506 Olive . . . GArfield 3700

KANSAS CITY, MO.
810 Baltimore . . . HArrison 1270

UPPER DARBY (Phila.), PA.
6908 Market St. . . . ALlegheny 4-3763

OMAHA, NEBR.
Omaha Nat'l Bank Bldg. . . . ATlantic 0188

NORTH Serves

Here is a new address which should be written in the handbook of every purchaser of telephone supplies in the Northeast.

THE NORTH ELECTRIC MANUFACTURING COMPANY
Supplies Division
GALION OHIO

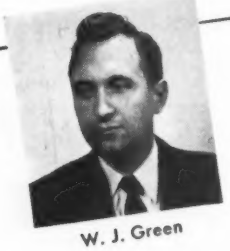
Meet Mr. M. G. Ryon
Manager of Region 1.

Meet Mr. S. A. Snyder
Manager of Region 4.

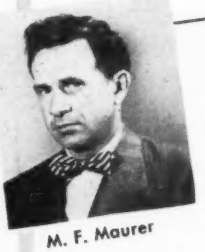
From this new and convenient location, all of Ohio, Lower Michigan, Indiana, Illinois, New Jersey, Pennsylvania, New York and the New England States, will get efficient spot delivery . . . set down where you want it, and when you want it, at the lowest possible delivery cost.

Also meet the men who assist in representing North in the Northeast.

Sales Engineers



W. J. Green



M. F. Maurer

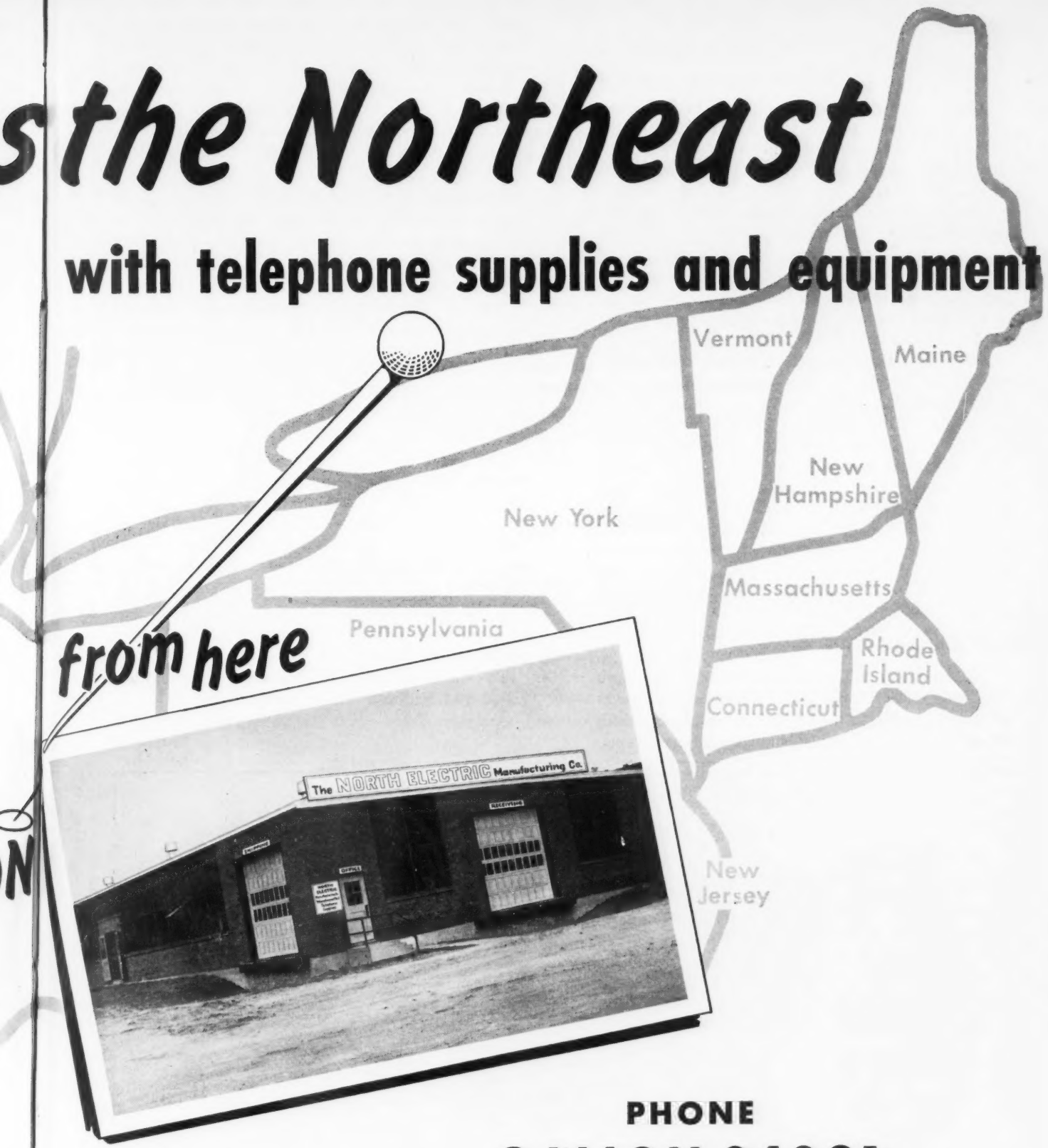
They will be glad to counsel with you on supplies, equipment or basic telephone engineering . . . to see that you get what you want . . . that you get the best . . . that you get it promptly.

When you want Telephone supplies or equipment, call the nearest of these men or North at GALION. Phone: Galion 24201.

NORTH

s the Northeast

with telephone supplies and equipment



PHONE

GALION 24201

THE NORTH ELECTRIC MANUFACTURING COMPANY

Go North for Service and Satisfaction

655 South Market Street, Galion, Ohio, U.S.A.

Outlook

Continued From Page 16

* * * * * * * * * *

average for all States. In addition to Delaware, others in the top-rank include Nevada ($2,250), the District of Columbia ($2,129), Connecticut ($2,080), New York ($2,038), Illinois ($1,983), and New Jersey ($1,959).

Regional changes in per capita income last year generally paralleled those in total income. In both measures, the largest percentage increases occurred in the Far West and Southwest, and the smallest in New England. In the other four regions, the increase in per capita was within one percentage point of that for the country as a whole.

Except in a limited number of cases, State differences in the rate of change in per capita income were relatively small. In Kansas, the rise in average incomes in 1952 was one-fifth; in South Carolina and Nevada, it was about one-tenth. These three States were among the four with the largest gains in total income last year. In the fourth, Arizona, the large gain in total income was accompanied by a 7 per cent population rise. In South Dakota, North Dakota, Wyoming, and Montana average income was lower in 1952 than in 1951. These were the four States in which large declines in farm income reduced total income in 1952 below that of the previous year.

A-T-&-T PLANS BIG ISSUE

. . . the 1¼ million stockholders of American Telephone & Telegraph Co. are due in coming weeks to receive rights to purchase new securities which should prove to be valuable, based on past experience. This will be the sixth time since the end of World War II that shareowners have been called upon to help finance the System's expansion program.

Except during the last war and during the thirties, investors in this company have at frequent intervals been given the right to subscribe for additional securities on terms that made this subscription privilege worth while.

Should the new rights be worth around $2 each, as was the case in the last two financing steps, it would mean that for the six issues the total value of rights received would be about $11 for each share held, or an average worth of $1.80.

Over the 8 year postwar period, which includes two years in which there were no warrants, the average value of rights would be about $1.40, which has been a substantial addition to the $9.00 a share annual cash dividend rate. Thus if this supplemental income is included in the annual return, the yield on the stock is materially increased.

The buyer of one share of American Telephone stock in 1946 at the mean price of 180 (1946 range was 200-¼ high and 159-¾ low) would today have six shares at an average cost of 150-¾ a share, assuming all rights were exercised, additional rights were purchased at the mean price and debentures converted.

In the postwar period the Bell System has spent 9-½ billion on new construction and has had a telephone gain of 18-½ million.

To finance these huge outlays the Bell System has raised $5.7 billion through new financing.

American Telephone & Telegraph, parent company,

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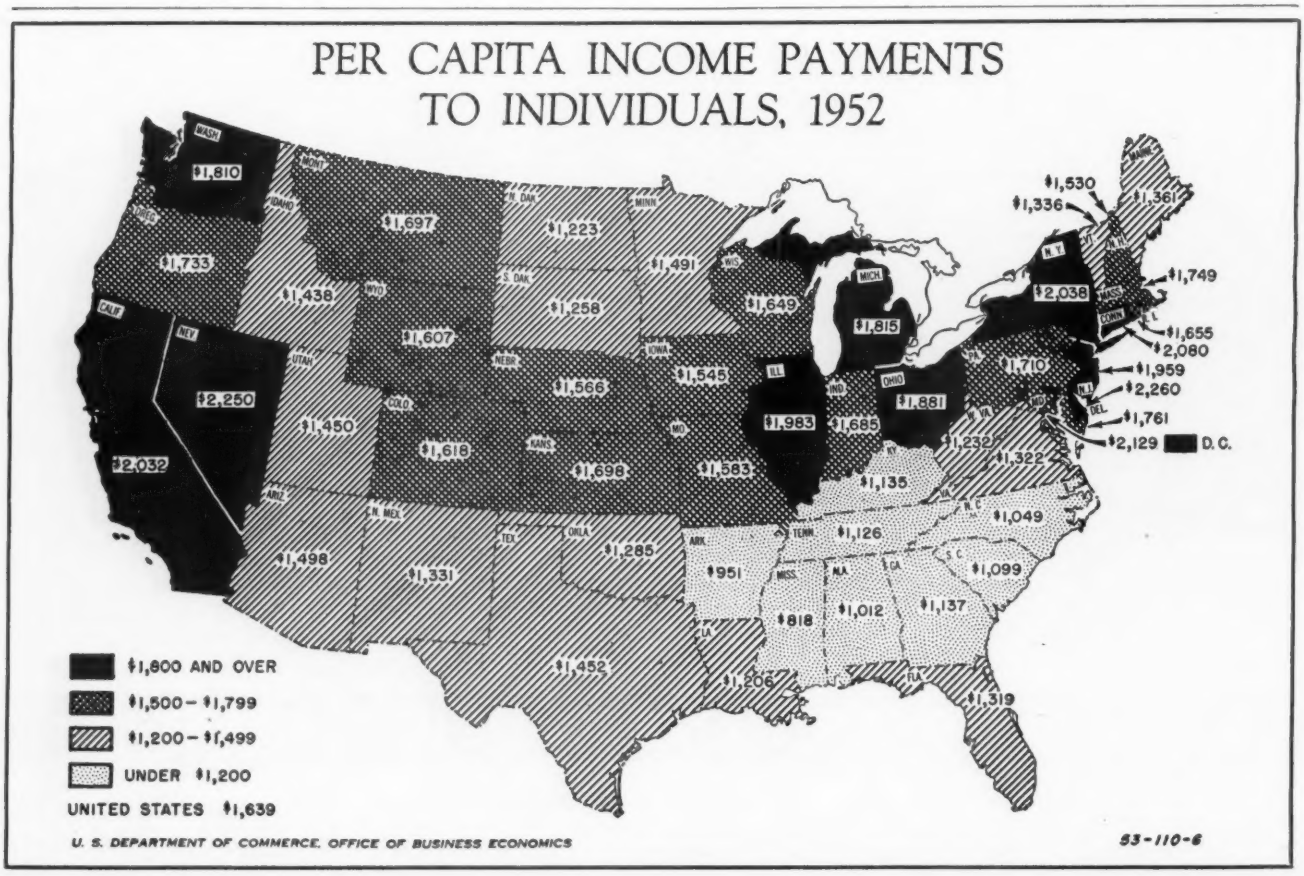


7 Years Service Experience Proves

1953 1954

1952

1951

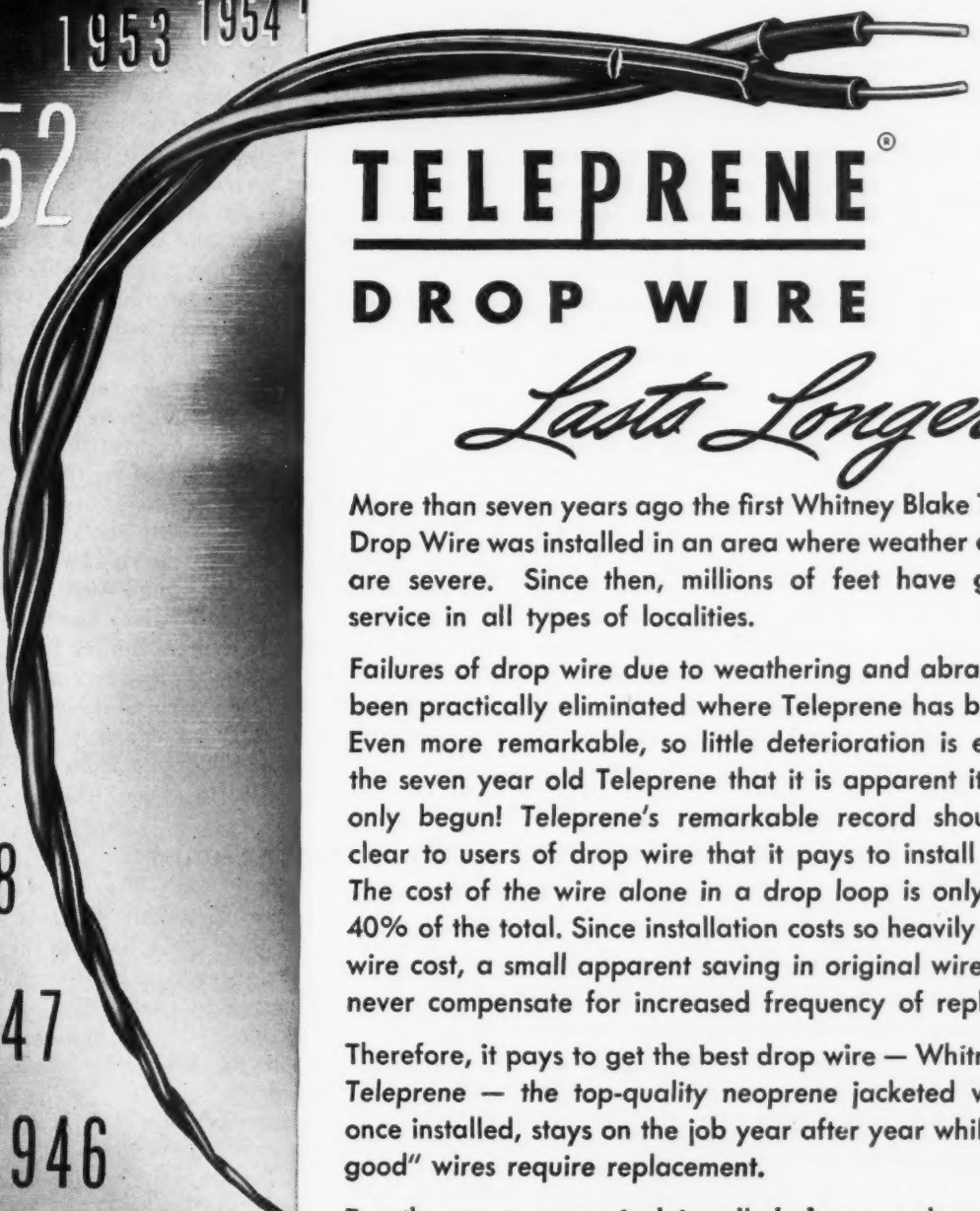
1950

1949

1948

1947

1946



TELEPRENE®

DROP WIRE

Lasts Longer

More than seven years ago the first Whitney Blake Teleprene Drop Wire was installed in an area where weather conditions are severe. Since then, millions of feet have gone into service in all types of localities.

Failures of drop wire due to weathering and abrasion have been practically eliminated where Teleprene has been used. Even more remarkable, so little deterioration is evident in the seven year old Teleprene that it is apparent its life has only begun! Teleprene's remarkable record should make clear to users of drop wire that it pays to install the best. The cost of the wire alone in a drop loop is only 20% to 40% of the total. Since installation costs so heavily outweigh wire cost, a small apparent saving in original wire cost can never compensate for increased frequency of replacement.

Therefore, it pays to get the best drop wire — Whitney Blake Teleprene — the top-quality neoprene jacketed wire that, once installed, stays on the job year after year while "pretty good" wires require replacement.

For the most economical installed drops, make sure your crews install Whitney Blake Teleprene.

WELL BUILT WIRES ® SINCE 1899

WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

Outlook

Continued From Page 20

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

has sold $2 billion of convertible debentures since 1946 and $875 million of straight debentures. Due to conversions, the amount of convertible debentures outstanding now approximates $220 million.

Also because of these debenture exchanges and the sale of stock to employes, the number of shares outstanding has increased from less than 20 million at the start of 1946 to more than 41.5 million currently. The conversion of debentures has provided a declining debt ratio.

As of June 30, debt outstanding was 39 per cent. Based on past experience, conversions are expected to be heavy just prior to the new offerings as holders seek to participate in the new offering.

Reflecting the substantial expansion that has taken place, net income of American Telephone has more than doubled in the postwar period. However, this has had to be applied to a greater number of shares sold to finance this expansion, but still coverage of the $9.00 annual dividend has improved. The $9.00 annual dividend rate has been maintained unchanged since 1922.

With the recent approval of a $625,000,000 issue of convertible debentures, each share holder will receive rights to purchase at par, debentures in proportion to his holdings of stocks. The debentures will be convertible, at the option of the holders, into as many shares of capital stock as the principal amount of the debentures surrendered for conversion in a multiple of $100, upon payment in cash for each share of the difference between $100 and the conversion price in effect at the time of conversion.

The debentures, to be dated Dec. 10, 1953, will be convertible into common stock beginning Feb. 9, 1954, at $136 per share, payable by surrender of $100 in debentures and payment of $36 in cash.

Stockholders were told that the money is needed to construct new facilities to meet the nation's demand for telephone service. Even with the unprecedented construction in recent years the Bell System has not caught up with the needs of the public.

Some half a million people are reported as waiting for service. About a million and a quarter customers on party lines want individual lines, or lines that they would share with fewer people. New demand for telephones is described as continuing strong while the volume of long distance calling has continued to increase.

The record volume of financing being undertaken in coming weeks would indicate that construction of new facilities in 1954 will again be on a large scale.

A tabulation of the last five offerings of convertible debentures by American Telephone follows:

Year	Amount Offered (Millions)	Value of Rights High	Low	Mean
1946	$343.0	2 11-16	1-1/2	2.09
1947	357.5	2 1-16	29-32	1.48
1949	394.4	1 7-16	1 1-32	1.23
1951	415.4	2 7-16	1-5/8	2.03
1952	492.6	2 13-32	2 1-16	2.23

The 1946 offering was the first of debentures since 1941 and prior to that in 1929 and 1918. There were direct capital stock offerings in 1930, 1928, 1926, 1922, 1921 and 1917.

When the 1952 offering was made, the stock was selling close to the current level and the conversion price was set at 136 on a 1 for 7 basis. As in previous instances, the financing was well received.

WE'RE LIVING LONGER

. . . the average lifetime of the American people reached a new high of 68.4 years in 1950, according to the Metropolitan Life Insurance Company's statisticians. This represents a gain of 21 years since 1900. During the prior half century — from 1850 to 1900 — the increase was only seven years.

As a result of the increase in longevity since the start of this century, the average American who now reaches age 25 has many years of life before him as did the average newly born baby of 1900.

Women have not only had a longer average life time than men during the past half century, but they have also made more rapid gains in longevity. In 1950 the expectation of life at birth for white females was 72.4 years, as compared with 66.6 years for white males, a difference of nearly six years.

The improvement in longevity, the statisticians note, has increased greatly the chances of survival to midlife and to the threshold of old age. With mortality conditions around 1900, only 66 out of every 100 newly born babies could be expected to reach age 40, and their remaining lifetime then averaged 28.3 years. Under current mortality, the chances of survival to age 40 are 92 in 100, and the expectation of life at that age is 33.1 years. Similarly, the chances of living from age 40 to age 65 have risen from 62 to 74 per 100.

BENSON'S CABINET FUTURE

. . . the key to Ezra Taft Benson's future in the Eisenhower cabinet, it is believed in Washington, will be the farm program he presents to the next session of Congress in January.

If Congress likes what he has to offer his position as Secretary of Agriculture would undoubtedly be strengthened.

If Congress doesn't like it, it is conceivable that Mr. Benson may choose to resign or that Republican Congressional leaders, worried about a possible political setback at the hands of the farmers in next year's elections, may force him to step aside.

Mr. Benson is in perhaps the hottest spot of any cabinet member, politically speaking. He has many critics, even within his own party.

Mr. Benson has made it clear that he is opposed to Federal farm programs which depend largely upon subsidies, production controls and high level price supports for achieving and maintaining farm prosperity.

Instead, he has said, the Government should use education and research to help farmers produce more efficiently and cheaply and also help producers develop new markets for their products.

This little wife went to market . . .

this little wife had to stay home!

The "office at home" is becoming more and more popular with real estate agents, insurance men, salesmen, service men and a host of other small business men. But how popular is it with the little woman who has to baby-sit with the phone every time her husband is out?

"Stuck with this phone again," she fumes, "when I should go to market!" AND SHE CAN GO TO MARKET — ANY TIME — if you will just let her know about Peatrophone — the mechanical secretary that answers the phone with a *personal* talk-out message, and records incoming calls accurately and permanently.

Here is a large, ready-made market for Peatrophone rentals - - all the Sallys and Sarahs and Susans who are tired of being business-phone stay-at-homes.

Never underestimate the buying power of a woman *when you have a product that will make life easier for her — at a cost of pennies a day!* And never underestimate the great new source of revenue to be derived from Peatrophone rentals.

Note: Selective harmonic ringing subsets now available — — all frequencies. Write for further information.

TELEPHONE ANSWERING & RECORDING CORP.
342 Madison Ave. New York 17, N. Y.

From The Rostrum

"Convention Quotes"

Many guides and timely pointers on management, policies and methods are presented in the following excerpts from talks by industry leaders.

"Have No Fear"

"If we don't help the industries progress — then the people don't get the service they should get."

WE ARE THE regulatory body. To a lot of you I know that that throws a little fear into you. I don't know why it should — although I can remember being in business at the Soo and when anyone from the Sales Tax office came into my store, I always got the jitters.

I suppose that they are just about like we are. We have a job to do. We're put in there by the people to serve the people. We have to serve the people and we have to serve the industries. If we don't help the industries progress, then the people don't get the service they should get.

So, I know that some of you folks need help. You can't hide it from me because I can go into the records and look it up. If you're not in there for help, don't look at me and blame me, because I'm inviting you to come in for help. The Staff is more than anxious.

I don't think that I can explain it to you any better than to give you a little example. There's a company up near where I come from — and I have always been suspicious that this very fine elderly lady needed help. She said she didn't; I asked her if she did. She has 197 stations, seems to be very happy; was voted the Woman of the Year three years ago in her community; she's always doing something for somebody else.

One day I went down to Mr. Hufferd and asked for her file and what I looked at would amaze you. She was getting less than one-half of one percent on her investment. She was living on a very mediocre wage. She has one operator; lives with her daughter (rather her daughter lives with her); and she has another operator besides that. She gives 24-hour service and out of 197 stations, she has 110 at $1.50.

Well, when I found that out the next trip I made up into our country I went to see her.

I don't know whether she liked it very well but she insisted she was doing all right. So, I said to her: "What would you do if you had a bad sleet storm?"

"Well," she said, "in that case I think I'd just fold up."

"Then," I answered, "I'm going to quit worrying about you — I'm going to start worrying about your 197 stations — what's going to happen to those people? I suppose they're sitting back, paying no attention to you, assuming that you're getting along all right, and if anything did happen, I suppose that they feel that Bell would come in and take you over. That's always the old story — Bell will take us over. What's going to happen to the Independent if your customers start feeling that way about you."

She gives unusually good service for the shape of her lines. Anyway she agreed to do something about it. But, she was still worried about the people in the district not being able to stand the increase. She said most of them lumber in the wintertime. They do a little fishing in the summertime. They're not on steady payrolls and she didn't think they could stand it. She said: "I think I'll lose a lot of customers."

So, I went into one of the grocery stores where a great many people in her district deal. I told the groceryman her story. He was really amazed. I said: "If anyone comes in complaining to you about this rate increase that she's going to get the first day of September what are you going to say?"

"Boy," he said, "I'll really pin them."

"Well," I said, "I have your support then. Someone has got to help this woman. Now she's going to get a rate increase. She's going to be back on her feet again but let's not have her lose these customers."

That's just one example. I was told, not by anyone on the Staff or any of the Commission, that they thought it wasn't very becoming of a Commissioner to go out to any

Please Turn To Page 26

TO THE POINT

" . . . there are still too many good telephone people living in the 'metallic age' — gold in the teeth, silver in the hair, and lead in the pants. First two conditions cannot be helped but last one can." — Quoted from Minnesota Telephone Association Newsletter.

Want Both PEAK PERFORMANCE and LOWEST COST for your RURAL LINES?

. . . and get ALL these important advantages

A new Copperweld* development, the O-Eighty-Thirty (diameter .080"—30% conductivity) now makes it possible to have the advantages of Copperweld on your short subscriber loops and secondary toll lines at lowest cost.

The high tensile strength of O-Eighty-Thirty permits safe, economical long-span construction formerly obtainable only with larger, heavier wires. Its light weight means easier, faster handling plus economies in construction and shipping costs. In addition, Copperweld has excellent transmission qualities at voice frequencies and is the only high-strength conductor that can be effectively converted to carrier circuits when expanded facilities are required.

Plan now to build your new rural lines with Copperweld O-Eighty-Thirty Telephone Line Wire. You'll soon discover this new, high-strength, non-rusting rural conductor is unequaled in economy.

Write us today for prices, sag data and staking tables—there's no obligation.

*Trade Mark

- Low Material Cost
- Low Construction Cost
- Minimum Maintenance
- Good Conductance
- Permanent Strength
- Long, Rust-Resisting Life
- Safe Long Spans
- Savings on Poles and Hardware
- Light Weight
- Easy to Handle

COPPERWELD STEEL COMPANY
WIRE AND CABLE DIVISION • Glassport, Pa.
SALES OFFICES IN PRINCIPAL CITIES

LOOK AT THE LONG SPANS YOU GET With O-Eighty-Thirty

LIGHT LOADING	150 to 550 ft.
MEDIUM LOADING	150 to 520 ft.
HEAVY LOADING	150 to 320 ft.

Many considerations enter into the selection of span length. O-Eighty-Thirty is versatile, readily adaptable to short, medium or long-span construction.

Copperweld TRADE MARK

Diameter .080" 30% Conductivity

LINE WIRE

SOLD BY LEADING DISTRIBUTORS

The only conductor combining the strength of steel with the conductivity and permanence of copper!

Build lines to stay with the CHANCE 8-Way

For best results, use the anchor that pushes *eight* blades into undisturbed earth all around the hole, with no wasted space between blades. This means complete, balanced load distribution.

Chance 8-way Anchors are available in a complete range of sizes from 60 to 200 square inches in area. Get full information today—consult your Chance Catalog—order from your regular supplier.

the CHANCE 8-WAY gives full load distribution

Anchor installations are *faster, easier* and *better* when line crews use the right tools. Chance tools are designed for efficiency and safety. The tools shown at right are what you need for expanding anchor installations.

1. Chance Combination Expanding and Tamping Bar. It hooks around the anchor rod and will not slip off.
2. Chance Telescoping Trip Auger—it bores like a bit, adjusts for various hole sizes, and has an easy dump trip.

Send for the Chance folder on the tools to use for better anchor installations.

You know it's RIGHT when you specify CHANCE

A·B·CHANCE CO·

CENTRALIA, MISSOURI
SAN FRANCISCO, CALIFORNIA

ANCHORS • GUYING FIXTURES • LINE CONSTRUCTION TOOLS • CONDUCTOR CLAMPS
GROUNDING EQUIPMENT • HOT LINE TOOLS • HIGH VOLTAGE SWITCHES • CUTOUTS

"Quotes"

Continued From Page 24

company and suggest that they ask for a rate increase. I don't feel that way about it. I feel that if your company needs more money your records will show it. Be sure that you've got the records to show it. If you don't have the records, let's get some records and get them up to date. Maybe you're going to have to spend a little money doing it but you can get it back. There isn't anything you have to spend, that you can't get back.

So, come in and let's get these things straightened out. If we look awfully busy when you walk in, you can always get in my office. After all, the minority member of the Commission is never too busy. I'm always there to help you at any time and you've had all year up to now to start your worrying. Your vacations are over. If you have a problem, come on with it. Come on in. Let's do it. Let's do it now. Let's get these things taken care of. — *Abstract of address presented by Commissioner Hunt, Michigan Public Service Commission, at the* 1953 *Convention of the Michigan Independent Telephone Association.*

"Rate Increases"

"I know the rate passed about among all the people who are using the service will be small in comparison to the return measured either in terms of money or in terms of convenience."

I FOLLOW WITH interest stories which appear in the newspapers regarding rate increases, which you seek from time to time, and I note that occasionally stories are written very critically of the increases which you seek, and the suggestion at present that they are against the public interest.

Suggestion is present that the public, on the one hand, must keep down the rates which you charge, but you are always seeking to raise them. I don't believe that is true.

Certainly you are faced, as an enterprise, with this problem. On the one hand, are you going to develop and give to the public, better and

Please Turn To Page 28

ANSONIA

Ankoseal®

THE ALL-PLASTIC CABLE

THE ANSONIA
WIRE & CABLE COMPANY
SUCCESSOR TO THE ANSONIA ELECTRICAL COMPANY
ANSONIA, CONNECTICUT • PHONE: ANSONIA 4-3306

YOU BUY DEPENDABILITY

WHEN YOU BUY A

RAYTHEON **RECTICHARGER**

(BATTERY CHARGER)

Dependability is the number one requirement of equipment for the Telephone Industry.

RAYTHEON **ENGINEERING REPORT**

SUBJECT: Oldest RectiChargeR
Careful testing and inspection of this unit reveals:

1. Electrical qualities in no way impaired (see chart).
2. A noticeable lack of rust or corrosion on chassis, hardware and components.
3. Original paint shows no sign of deterioration.
4. No evidence of embrittlement or cracking in varnish on magnetic components.
5. All hardware sound and secure.
6. Cable firm and unbroken.
7. Lacing intact with all wiring firmly in original position.
8. All soldered joints secure and strong.

(Signed) George L. Blais
ENGINEERING DEPT.

The dependability of Raytheon RectiChargeRs is amply demonstrated by the service records of units now in use. A typical example is shown in the Engineering Report at the right. And there's no reason why the "old" RectiChargeR described in the report can't go on giving the same faithful service for many more years.

It's no accident that Raytheon RectiChargeRs are setting performance records. Every detail of electrical and mechanical design has been carefully worked out with dependability as the guiding principle.

You get dependability automatically when you buy a Raytheon RectiChargeR, just as you get fully automatic battery charging — with constant voltage output over the complete load range regardless of input change — without under or overcharging.

Specify Raytheon RectiChargeRs and RectiFilteRs for completely dependable Telephone service. Your supplier offers a complete line for all requirements. Ask him for details or write direct.

RAYTHEON
MANUFACTURING COMPANY
EQUIPMENT SALES DIVISION
DEPT. 6270-TE, WALTHAM 54, MASSACHUSETTS

DISTRICT OFFICES: BOSTON, NEW YORK, CLEVELAND, CHICAGO, NEW ORLEANS, LOS ANGELES (WILMINGTON), SAN FRANCISCO, SEATTLE
INTERNATIONAL DIVISION: 19 RECTOR ST., NEW YORK CITY

RAYTHEON PRODUCTS INCLUDE: RectiChargeR* battery chargers; RectiFilteR* battery eliminators; Voltage stabilizers (regulators); Transformers; Tubes and other electronic equipment.

*Reg. U. S. Pat. Off.

"Quotes"

Continued From Page 26

better means of communication. Now, in doing so, the costs thereof and therefor must be met, or are you going to remain static in your rendering of service to the public and thus permit an under development or no development at all by the results of scientific research?

I think that as consumers and users of the telephone, each has received more and better service from utilities and must expect to pay for that service just as we would pay for improvements on automobiles.

I would assume that I could go into any automobile plant today and buy any automobile according to certain specifications without power steering, without power brakes, without hydromatic, or its equivalent in transmission, literally a stripped automobile, and pay a price much cheaper than I would for that same car with full equipment, but I am not inclined to do it. I want a car that has those conveniences.

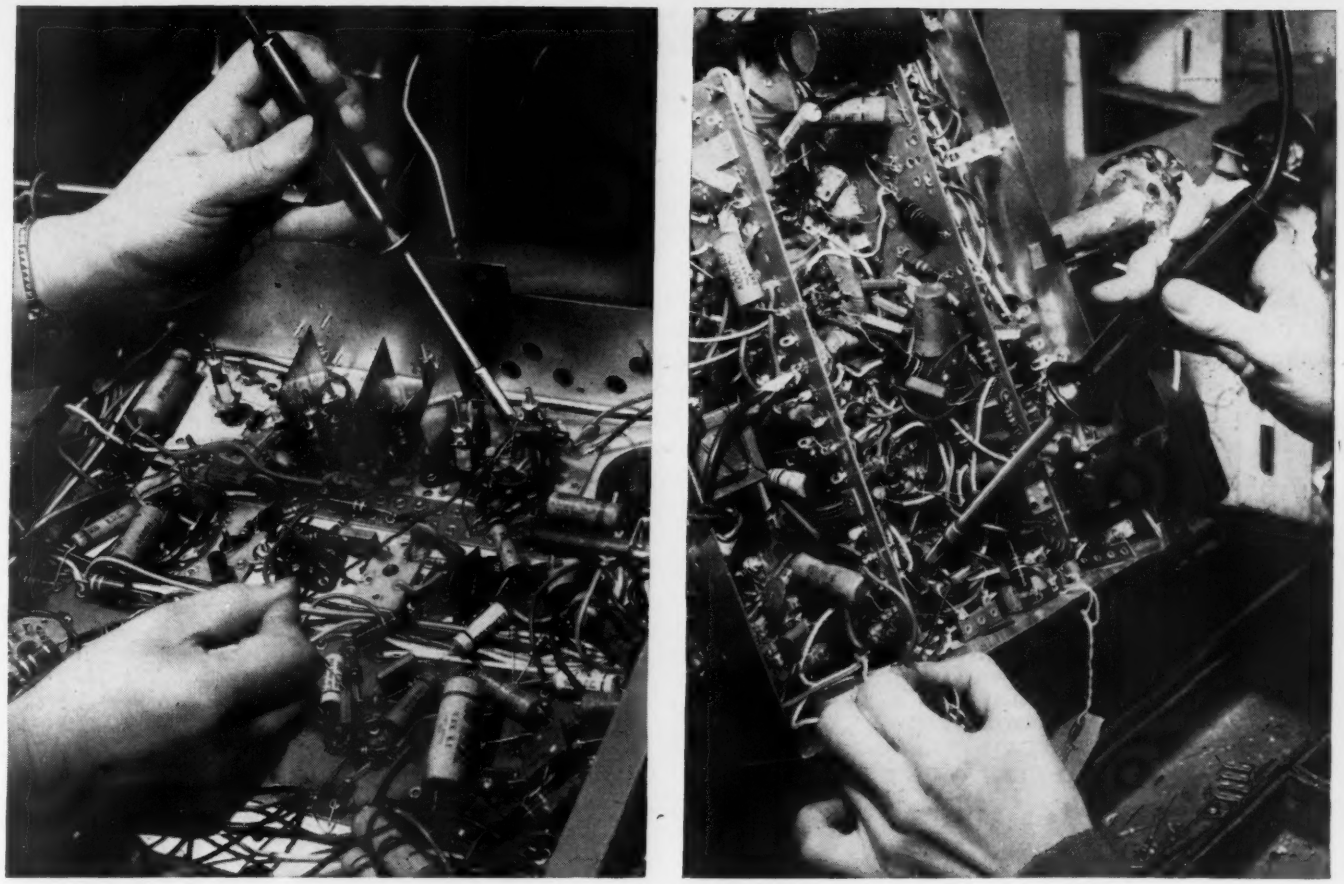
By the same token if I place a telephone call from here to Los Angeles, I would like to have that call properly serviced. If I can talk with my party at the other end in three minutes, I would rather do that than to wait an hour and a half for the placing of that call, and I am as annoyed as you are and all people are to be told the circuits are busy. Yet I realize if circuits are not to be busy there must be more circuits, and I know that to do that costs money.

Rationalization of these circumstances, on the part of the public, would result in their agreement with you that rates consistent on the one hand with services rendered, on the other hand with developments undertaken are to be desired rather than to be abhored because under those circumstances the public can be better served.

Partly, because you are a part of enterprise and because you have investments in your businesses, while others have investments in the business which you are managing, you are entitled to a return, which we call profit.

Now, to my mind, the profit sys-

Please Turn To Page 32



G-E MIDGET AND G-E LIGHTWEIGHT IMPROVE SOLDERING EFFICIENCY AND SPEED IN TIGHT PLACES.

Now—2 G-E Irons for Hard-to-solder Places

FAST PRODUCTION WITH THE G-E LIGHTWEIGHT

Quick heat recovery and easy handling combine to give you quality production at high speed. The thin, $\frac{5}{16}$-inch diameter shank allows easy soldering where a bulkier iron can't reach or would cause damage to insulation and surrounding parts.

PINPOINT ACCURACY WITH THE G-E MIDGET

Soldering difficult joints is as easy as writing with a pencil when you use the slender, 1¾-ounce, 6-volt midget iron. Power costs are cut to one-fourth those of a regular iron, and tip heat can be closely controlled with the optional four-tap transformer.

BOTH LIGHTWEIGHT AND MIDGET IRONS OFFER YOU:

Longer Service, Lower Maintenance—Extra long wearing Ironclad tips resist pitting and corrosion, giving you longer service for both high-speed repetitive production line soldering and intermittent work. General Electric Calrod* heaters provide dependable, efficient operation throughout their long life. The tip and heater unit is easily replaced by unscrewing it from the handle.

Reduced Operator Fatigue—Both irons are light in weight, well balanced, and have comfortable handles. Easy handling helps cut rejects and increase operator speed and efficiency.

SOLVE YOUR SOLDERING PROBLEMS TODAY

For the complete story on the G-E Lightweight and Midget soldering irons contact your G-E Apparatus Sales Office or Distributor. Additional information is yours by mailing the coupon below.

*Reg. Trade-mark of General Electric Company

Section E720-115
General Electric Co.
Schenectady 5, N. Y.

Please send me the following bulletins:

☐ For immediate project ☐ For reference

☐ GED-1583, G-E Lightweight Soldering Iron.

☐ GEA-4519D, G-E Industrial Soldering Irons.

Name.....

Company.....

Address.....

City..... State.....

You can put your confidence in—

GENERAL ELECTRIC

"And one dose of my famous elixir will make you feel young enough to run all the way to the next pole."

• No wonder that elixir is famous! It's a long run from one pole to the next. They're strung with Amertel 135, a high-strength telephone wire which permits spans up to 2½ times as long as if ordinary BB wire were used.

Here are some other points to remember about Amertel 135. Although its initial cost is higher, it saves money right from the beginning by cutting installation costs. You dig fewer holes, need fewer poles and less pole hardware. You save hundreds of man-hours of labor per mile. Maintenance costs are materially lower. And Amertel 135 has low electrical resistance, along with better voice transmission characteristics.

Like more information? Write American Steel & Wire Division, Rockefeller Building, Cleveland 13, Ohio.

AMERICAN STEEL & WIRE DIVISION,
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GENERAL OFFICES: CLEVELAND, OHIO
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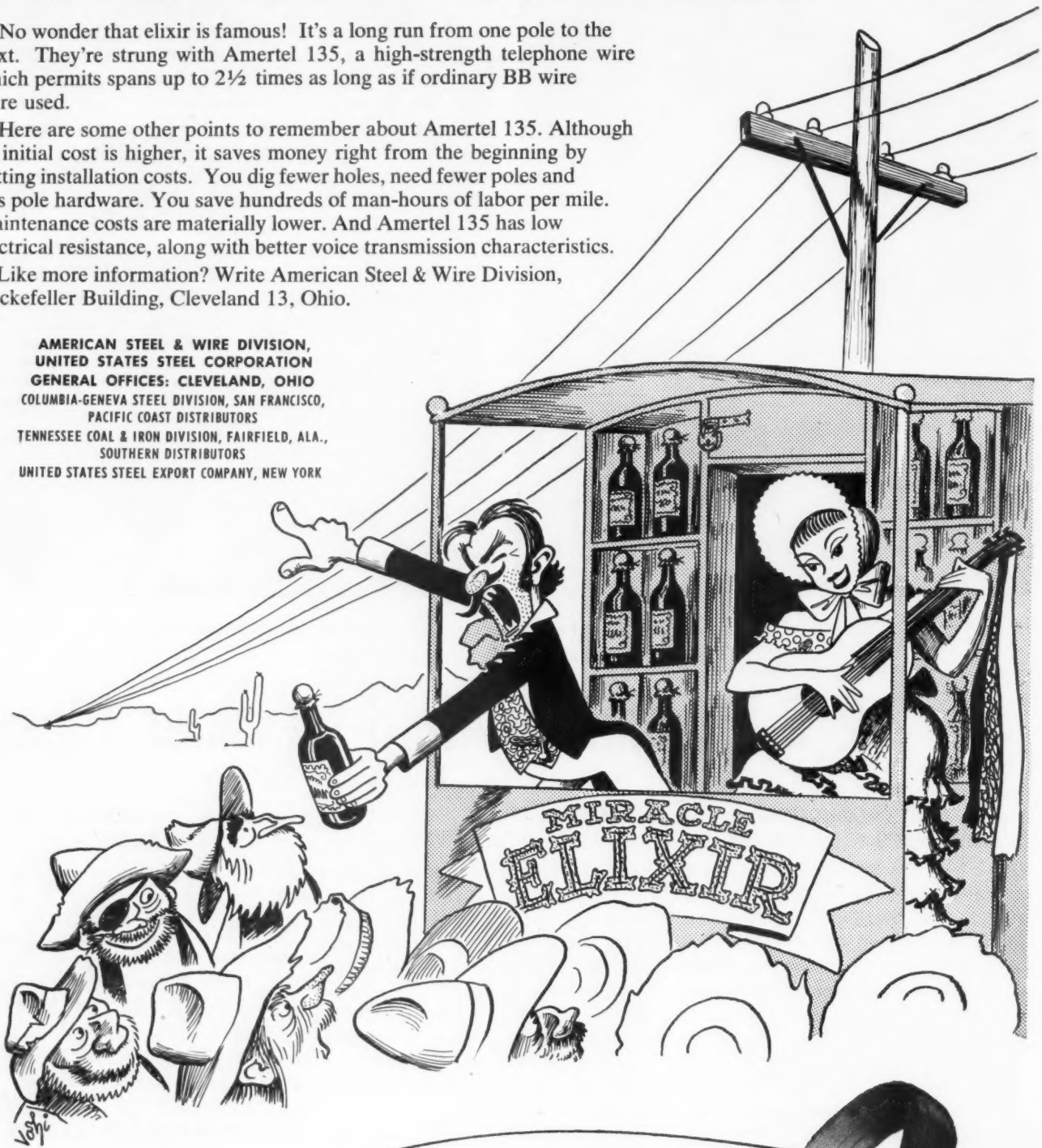


LOOK FOR THIS TAG
It is your assurance of highest quality wire.

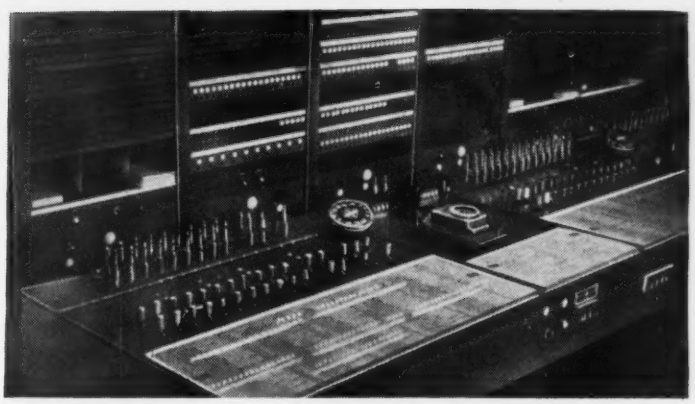
U·S·S AMERTEL

TELEPHONE & TELEGRAPH WIRE

UNITED STATES STEEL

CALCULAGRAPH ACCURACY!

...works for you in important cost-saving ways



Photos courtesy of Automatic Electric

MODEL 33
FOR SWITCHBOARD
MOUNTING - OTHER
MODELS TO MEET EVERY
INSTALLATION NEED

AUTOMATICALLY FIGURES TOLL TIME! With Calculagraph on the job, there is no need for time-consuming, service-slowing manual figuring of elapsed time. Calculagraph does it all quicker, easier and, most important, with complete accuracy.

ACCURATE TO THE SECOND! Calculations are accurate down to the last second. Authoritative and indisputable, they make it possible to collect all the revenue due on every toll call — a basic advantage in exchanges large or small.

PERMANENT PRINTED RECORDS! Calculagraph prints elapsed time on permanent toll tickets which make accounting methods simpler, more efficient. Toll tickets are easy to read, remain legible permanently and are available for reference at any time.

COMPLETE INFORMATION ON AUTOMATIC TOLL TIME CALCULATING AND RECORDING IS CONTAINED IN THE CALCULAGRAPH FILE CATALOGS . . . WRITE TODAY.

THE STANDARD OF ACCURACY SINCE 1892

CALCULAGRAPH COMPANY
HARRISON • NEW JERSEY

Please send copy of the new catalogs on automatic toll time calculating and recording.

NAME_____ TITLE_____

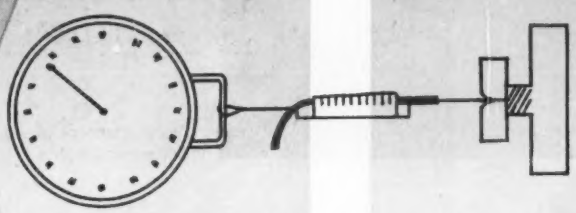
COMPANY_____

STREET_____

CITY_____ ZONE____ STATE_____

ALPHADUCT

P clamp adhesion test



The conductor must break before it slips

P clamps are the most widely used method of attaching drop wire to buildings. Lest you may worry about a P clamp causing slipping of the insulation or jacket on Alphaduct Neoprene Jacketed Drop Wire — read about this Alphaduct service test. This test is made daily.

A sample of Alphaduct wire is inserted in a P clamp with 12 inches of the wire projecting from the top of the clamp. The bail of the clamp is then inserted in the upper jaws of a tensile testing machine, and the end of the wire is stripped free of jacket and insulation and inserted in the other end of the machine.

The jaws of the machine are then gradually separated until the conductor breaks. The conductor must break before there is ANY slipping of either the jacket or the insulation.

Don't have any worries about a little old P clamp hurting ALPHADUCT drop wire. Try Alphaduct. It's dated by a color coded thread so you can see for yourself how long it lasts, how much money it saves.

ALPHADUCT WIRE AND CABLE COMPANY • MILLTOWN, NEW JERSEY
NATIONAL DISTRIBUTORS • LEICH SALES CORPORATION, CHICAGO, ILLINOIS
REGIONAL DISTRIBUTORS • PANKEY SUPPLY CO., CHARLOTTESVILLE, VA.
THE LINDSAY TELEPHONE SUPPLY CO., CLEVELAND, OHIO

"Quotes"

Concluded From Page 28

tem in America is to be encouraged in every sense of the word, rather than discouraged.

You must place before the public, at all times, the figures bearing upon your cost of operation and the figures of profit in their relationship to stockholdings, in their relationship to costs, and their relationship to service and production. In my mind, in the stories I have read, and the figures that have been submitted to me, you have never undertaken to exceed propriety so far as profit is concerned. While engaged in a given line of business, you are just as desirous of maintaining a life, which is stable and equitable as are those in any other field. So, personally, I found nothing wrong in the methods of approach to this problem of public service, which are motivating you at the moment. I hope that there can be better and better service, greater and greater research and experiment, and I know that the rate passed about among all the people who are using the service will be small, indeed, in comparison to the return measured either in terms of money or in terms of convenience.— *Abstract of address presented by* OWEN J. CLEARY, *secretary of the State of Michigan, at the* 1953 *convention of the Michigan Independent Telephone Association.*

Support

"It is axiomatic that when people support the government, they control the government. This is what we as a free nation have always demanded and gloried in. Now, however, the exact opposite, also axiomatic, is spreading, and has been for 20 years: When government supports the people it will control them. That's the last thing we want to see happen because it leads to dictatorship and tyranny." — Babylon (New York) Eagle.

Here are some interesting facts Boss, on Reliable's "HV" (High Voltage — High Current) PROTECTOR

1. **Extra large** cylindrical carbons for rapid dissipation of heat of discharge.
2. No. 10 AWG insulated copper leads are joined to the electrodes by pressure method — no solder to melt.
3. Precision ground steatite ceramic base supports and aligns carbon electrodes.
4. Tapered neoprene grommets seal and reinforce wires at entrance to protector.
5. Electrode mounting posts recessed and protected from arc-over.
6. Fully tested with voltages and currents equal to field conditions.
7. Bracket and removable cover of heavy corrosion-resisting aluminum.

A Reliable Product worthy of investigation . . . ask to see it without obligation.

RELIABLE ELECTRIC COMPANY
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Reliable

Telephone Protective and Terminal Equipment for all Station, Line and Central Office Needs.

OVER 45 YEARS SERVICE TO THE TELEPHONE INDUSTRY

"Two of my men were able to install 25 RT&E terminals in two days. An average cost $4.56 per terminal..."

says R. B. McKINNEY, Pres.
EASTERN ROWAN TELEPHONE CO.
GRANITE QUARRY, N. C.

Eastern Rowan Telephone Company, Inc.
GRANITE QUARRY, N. C.

EXCHANGES
GRANITE QU
ROCKWELL
FAITH

R. B. McKINNEY, PRESIDENT
E. M. PEARCE, VICE PRESIDENT
M. S. GANTT, SEC'Y & TREAS.

August 15, 1952

R T & E Co.
632 N. 8th Street
Milwaukee, Wisconsin

Gentlemen:

This is to thank you for the prompt shipment of 60 type MP Cable Terminals ordered 7-28-52.

Since this cable terminal is something new, we felt that it would be advantageous to keep accurate installation cost records, which we have done on the first 25 terminals.

One member of our installation force, together with a helper, installed 25 of these terminals (14-6 pr. and 11-16 pr.) in the first two days.

A breakdown of the installation cost of these terminals is as follows:

Direct labor cost	$ 56.00
Truck expense (hired truck @ $1.00 per hr.)	16.00
Miscellaneous material (25 drive screws and through bolt nuts)	4.50
Payroll, taxes, insurance and general overhead	37.50
TOTAL COST FOR 25 TERMINALS	$114.00
Average installation cost per terminal	$ 4.56

We feel that this is an average cost per terminal for cutting in the terminals in our system.

Sincerely,

R B. McKinney

President

JW/RBM

Eastern Rowan Telephone Co. recently made system improvements to meet their growing telephone needs.

Cable Splicing Made Easy

R T & E has designed a terminal for use with plastic insulated and jacketed cables to save installation time. The need for cutting a cable to enter a terminal is eliminated and the total time for terminating is radically reduced. The terminal employs the principle of split grommets, which allows the cable to be looped into the terminal, the outer jacket and sheath removed, a small portion of the insulation removed from the pairs to be terminated and the entire operation completed without cutting the cable.

The type MP terminal provides a convenient point for accessability to all cable pairs for test, check or connection without reopening the cable.

WRITE FOR BROCHURE

Sold through Leading Distributors

632 N. EIGHTH ST.
MILWAUKEE 3, WIS.

R T & E Co.

BRANCH PLANT:
WAUKESHA, WIS.

On any Thermoplastic Telephone Cable Installation

☑ CHECK General Cable PLASTIC TELEPHONE CABLE

Double-Check these advantages:

- ☑ Easier handling and splicing.
- ☑ The right weight for simpler and more economical installation.
- ☑ Fine transmission qualities resulting from Polyethylene insulation.
- ☑ Superior physical stability in service (assured by tough and uniform vinyl jacket—resistant to sunlight, moisture, oils and chemicals).
- ☑ Broad availability (19, 22 and 24 A.W.G.) and up to 101 pairs in concentric or unit construction. Quads and composites also available.

Every General Cable product is backed by 70 years of research and experience.

For information and service see our national distributors:

AUTOMATIC ELECTRIC SALES CORPORATION • Chicago, Ill.

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PAPER TELEPHONE CABLES: Standard in small sizes with concentric construction, large sizes with unit type construction. Quads and composites are also available. For additional protection they can be furnished with antimony lead and: Steel tape armor and jute; Round steel wire submarine armor and jute; Jute over lead for direct earth burial.

GENERAL CABLE
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CUT BRUSHCUTTING COSTS UP TO 83%!

POWER-DRIVEN BRUSHMASTER®

amazing, one-man-operated brushcutting machine is

☆SAFE! ☆EFFICIENT!
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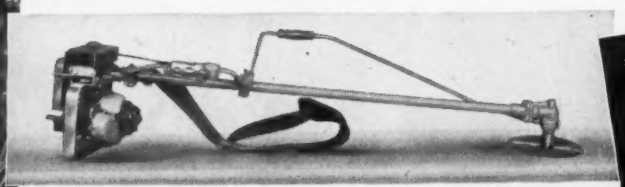
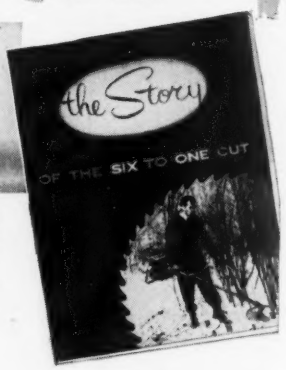
colorful FREE BOOKLET SHOWS HOW

the "machine magic" of BRUSHMASTER can effect important brush clearance savings for your company. SEND TODAY!





It's one man . . . instead of six . . . when Brushmaster takes the field! Count up the savings! Quickly, easily the circular saw blade cuts through matted grass, vines, briars, . . . even saplings to 4" in diameter! SAFE . . . operator cannot come in contact with blade! MOBILE . . . operates overhead, close to ground, right to left and back again! Vibration-free, clutch controlled, positive drive.

BRUSHMASTER SAW, INC.
848 EMERALD ST., KEENE, N. H.

Subsidiary of Harrington & Richardson, Inc., established 1871. Manufactured and sold in Canada by H&R Arms Co., Ltd. Montreal, Canada

For *Superior* Poles

WHEN YOU NEED 'EM

Large stocks of Southern Pine at two modern plants enable Taylor-Colquitt to supply superior poles *when they are needed.*

These stocks, selected from the finest stands of Pine in the Southeast, are the products of rigid controls. From forests to plants . . . through carefully supervised steps in manufacture and treatment, these controls safeguard quality . . . assure poles of uniformly high strength and inherently long life.

During more than 27 years, telephone companies in increasing numbers have looked to Taylor-Colquitt for *superior* poles when they need them.

Tayor-Colquitt poles are distributed to independent telephone companies exclusively by Automatic Electric Sales Corporation, 1033 West Van Buren Street, Chicago 7, Ill.

TAYLOR-COLQUITT CO. TIMBER CONSERVATION T-C

TAYLOR - COLQUITT CO.
SPARTANBURG, SOUTH CAROLINA

PLANTS AT SPARTANBURG, SOUTH CAROLINA AND WILMINGTON, NORTH CAROLINA

POWERS American

SERIES HD-1

Fully-Powered

HYDRAULIC DERRICK

- LIVE BOOM — CAN BE OPERATED UNDER LOAD
- INFINITE OPERATING POSITIONS

  REQUIRES ONLY SINGLE-DRUM WINCH
- LIFTS LOADS TO BODY PLATFORM
- NO CENTER LEG TO OBSTRUCT BODY CARGO AREA

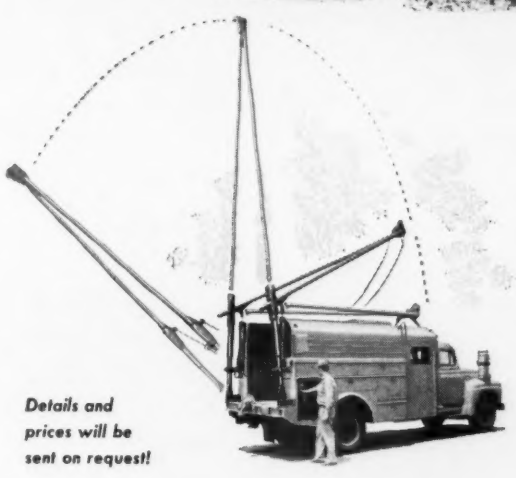
"The Accepted Standard with Utilities Everywhere"

Operation of the Series HD-1 derrick is *completely hydraulic.* It is raised to working position, elevated or lowered to desired height, and returned to carrying position . . . hydraulically.

There is no mechanism to endanger workmen — no center leg to obstruct the body cargo area — no manual operation, other than insertion and removal of locking pins, and shifting of hydraulic control levers.

This is a *heavy-duty* derrick which will handle poles up to 55 ft. in length — under the most severe operating conditions.

Capacity, with head sheave 5′ to rear of body, is 6000 lbs. When extended to 14′, capacity is 2500 lbs.



Details and prices will be sent on request!

THIS IS A "Live Boom" DERRICK

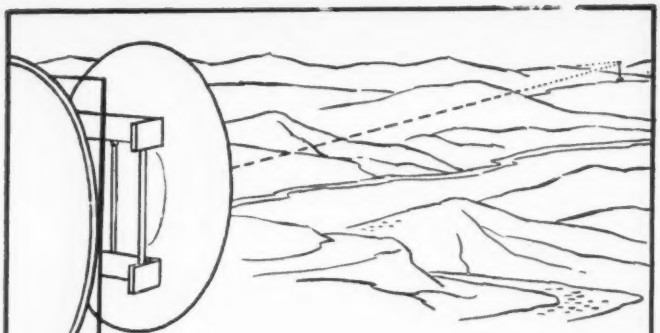
There are no pre-determined "stops" to limit operation of the derrick. It can be spotted in an unlimited number of positions, and moved at any time — even while supporting a full load.

Twin hydraulic rams raise the derrick from carrying position to working position in less than a minute. When derrick is spotted, a poppet-type control valve seals oil in cylinders to prevent "kick back" or "creeping".

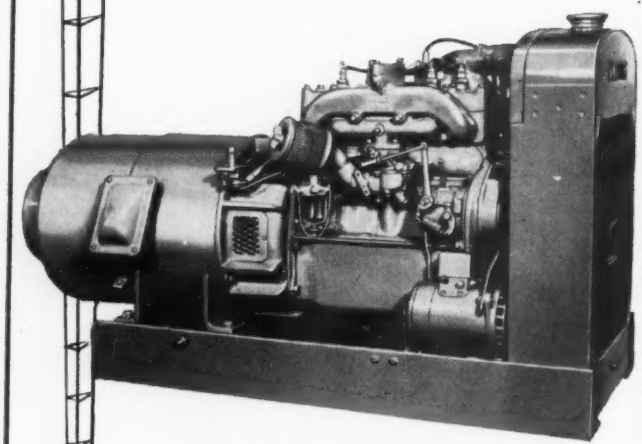
POWERS-AMERICAN DIVISION

McCABE-POWERS AUTO BODY COMPANY

5900 NO. BROADWAY • ST. LOUIS 15, MO.
428 LATHAM SQ. BLDG. • OAKLAND 12, CALIF.

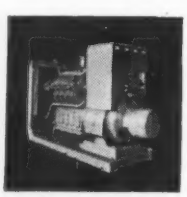


Insure continuous Microwave operation with "US" Electric Plants



Dependability in "U.S." Electric Plants is the result of good design, rugged construction, and freedom from "gadgets." The unit shown is 12.5 KVA, 120/240-Volt Alternating Current. Write for information on the many "U.S." units built for Microwave service. "U.S." personnel is active in the design and development of microwave engine-generator sets in conjunction with R.T.M.A.

"U.S." builds hundreds of Electric Plant models (The World's Most Complete Line)—from 300 watts to 200 KW. AC and DC. Powered by gas, gasoline and diesel.



UNITED STATES MOTORS CORP.
420 Nebraska St.
Oshkosh, Wisconsin

Every anchor man prefers the CHANCE 8-WAY

Not two... Not four... but EIGHT blades

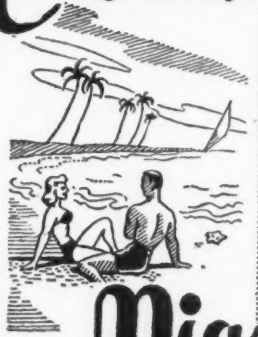
for better load distribution

Specify **Chance Anchors**

BUCKEYE TELEPHONE & SUPPLY CO.
1250 KINNEAR ROAD COLUMBUS, OHIO

AT MIAMI BEACH

The Coronado



Enjoy Your Vacation-Holiday at the Breeze-swept CORONADO. Dancing in Outdoor Patio... Beautiful Swimming Pool... Private Beach... Cocktail Lounge... Delicious Food... Large Free Parking Area... Convenient to all Attractions... Congenial Guests... Open All Year... Restricted Clientele... Churches Nearby... Reasonable Rates.

EDWARD W. COLLINS, Mng. Dir.
8741 Collins Avenue

Miami Beach

GraybaR TELEPHONE NEWS

THE FIRST PAY BOOTH TELEPHONE CALL!

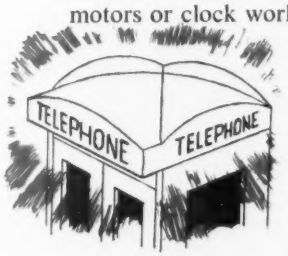
Historians say that in 1882, Alexander Graham Bell placed the first toll call to Chicago from this curtained and carpeted booth in New York. Rates for this new innovation in telephone service were $9.00 per 5 minutes and callers considered themselves fortunate when connections were made in under an hour.

... AND TODAY'S MODERN OUTDOOR SERVICE

Outdoor booths – Give your customers the best in outdoor pay-station service by using these rugged weatherproof booths. Shipped set up and ready for use, they're available painted in standard slate grey or in distinctive special colors at slight additional cost.

ROUND-THE-CLOCK REVENUE

Electronic controls – Install Ripley Night Watchman units in all your booths. An electronic eye turns on booth lights at dusk, turns them off at daybreak. Unit is easy to install . . . has no motors or clock work to freeze or run down.



Glo-dome roof – Add a plastic Glo-dome roof and you have a truly unbeatable combination for increased revenue. The Glo-dome, which glows brightly to attract attention all night long, fits standard booths now in service and when specified can be furnished on new booth orders.

Pay station units – Graybar can supply Autelco-Gray pay stations equipped with the same dials, handsets, and induction coils you use in your standard sets. In this way, you can be sure of holding inventories of maintenance parts to a minimum. 385-2211

Signs and brackets – Tell out-of-towners and local residents of your outdoor service by using good signs in the right places. Several types of signs and brackets are illustrated here, but for complete details on others, as well as equipment for all indoor or outdoor installations, consult your local Graybar Representative – he'll be glad to assist you.

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("Astra-Dome" and "Lite-Omatic" switch Optional Extras)

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TELEPHONE
ENGINEER & MANAGEMENT
NOVEMBER, 1953 VOL. 57, No. 11

EDITORIAL

The Significance Of The 50,000,000th Telephone

THERE HAS BEEN a significant change during the past decade or so in the attitude of the public toward telephone service.

At least this is the only way, we think, by which you can explain the installation of the 50,000,000th telephone in 1953 — more than twenty years earlier than it would have been installed at the rate of telephone growth prevailing just before World War II.

We can get some idea of what has taken place and is taking place in the telephone industry, by comparing prewar and post-war growth of telephones.

During the war, telephone growth was restricted. During the seven years next preceding our entry into the war, telephones in this country increased by some 6,800,000. But during the seven years immediately following the war, telephones increased by something more than 20,000,000!

During this seven year postwar period, the Bell System added more telephones than it had in service just before the war. Statistics available for Independent companies show that their rate of growth was also high and, as to the larger companies, comparable in many cases to that of the Bell System.

Also, during the seven year postwar period, toll service was practically doubled, and has more than doubled in the past ten years.

What has caused this extraordinary demand for telephone service?

The time is past when it could be attributed to "catching up" on telephones after the war. Nor can it be attributed principally to increase of population, since telephones per 100 of the population are at present higher than ever before.

Undoubtedly the so-called "boom times" of the postwar years were the greatest single factor in this tremendous growth of telephones. But we have had "boom times" in this country before, and never before, in any of them, has there been so great a demand — percentagewise or otherwise — for telephones.

What causd so great a rush for telephone service this time?

We do not believe that all the factors enumerated above, put together, accounted for this unprecedented demand for more telephone service.

It seems to us that there is another factor in this situation; not necessarily a new one, but one which has become more important and more weighty than it has ever been before. It has been called the "telephone habit."

We believe that in these postwar years the telephone has become more of a necessity to the public than ever before; that it is no longer a luxury and no longer something that can be casually dismissed as simply a convenience. We think it has become an important and integral part of the everyday life of the people.

That, we believe, is the only way you can account for the tremendous and unprecedented demand for and growth of telephone service in these postwar years.

And that, we think, is the true significance of the installation of the 50,000,000th telephone — not in the year 1970-odd, but in this year of 1953.

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How to pick up extra revenue that makes sense to you and your subscribers alike

New Stromberg-

For complete specifications and circuit information, write for a free copy of Bulletin T-117.

-Carlson 2-10 Dial PBX

offers your subscribers unattended service with 2 outside lines and 10 internal stations at a very moderate cost . . .

Any office, factory or professional business requiring 2 outside lines and up to 10 internal lines will listen with interest to your suggestion for use of this *new* Stromberg-Carlson 2-10 dial PBX system.

The *new* 2-10 dial PBX combines the services of the *new* 10-line dial PX equipment and the *new* 1573 2-line telephone. Each station has access to 2 outside lines—with a *hold* button for each line—the third line of the 1573 telephone connects to the 10-line dial PX equipment.

Trunk calls can be answered at any station and transferred to any other station equipped for outside service. A variety of applications using standard telephones for internal service and 2-line telephones for internal and outside service make this system one of the most flexible that you can offer to your subscribers. The system also includes all the necessary features of selective talking, ringing, and busy tones.

With the use of Stromberg-Carlson's *new* 1573 2-line telephone and the *new* 2-10 dial PX equipment, you can now offer a modern 10-line PBX which has the advantage of not requiring the services of a PBX operator—a savings to your subscriber . . . at moderate cost.

Take a moment to check prospects for this service in your area —or ask your Stromberg-Carlson representative to do such a survey for you. We're sure you'll uncover a wealth of extra revenue ready and waiting to be tapped!

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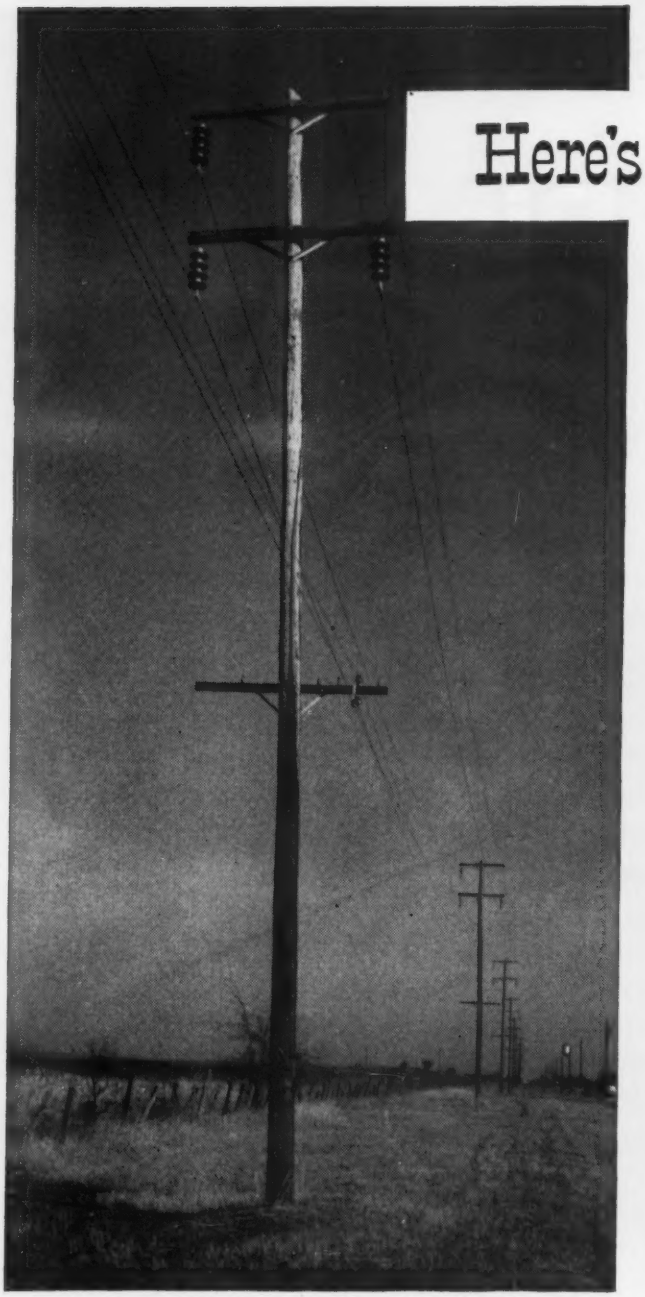

Here's Proof of Performance...

Texas Power and Light Company reports on 630 creosoted poles installed in 1913:

90% still in service

40-YEAR-OLD CREOSOTED POLES in Texas Power & Light Company's line between Ferris and Corsicana, Tex.

CLOSE-UP of another pole in the section showing its excellent condition at the ground line.

TEXAS Power and Light Company in 1913 installed some 630 creosoted poles in the section between Ferris and Corsicana, Tex.

After 40 years of exposure to intense summer heat and wintry weather, 90% of the original poles are still giving excellent service. And officials of the T. P. & L. Co. estimate there are still years of life left in the creosoted poles—equal to the total life of untreated poles.

This kind of service is typical of poles treated with Creosote, and it's the major reason why Creosote is the first choice of preserved wood users.

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UNITED STATES STEEL

From The Capitol—

WASHINGTON BUREAU REPORTS

By ROLAND DAVIES & FRED HENCK

Washington observers discuss tax outlook for 1954 . . . REA's new rural telephone policies taking shape . . . Senator Schoeppel denounces government enroachment.

"I DON'T KNOW what's going to happen, and I don't think anyone else does. My home office won't believe me, though, and they keep asking me for authentic forecasts. So I just try to outline the situation for them, and bring it within certain limits, and tell them to wait until about the last day of next year's session of Congress."

That was the answer to this column when we asked one of Washington's most respected fiscal-tax reporters, the capital correspondent for a leading journal, what he thought about next year's tax outlook.

If he doesn't know, we don't either, but it is obvious that there are certain considerations that business and civic leaders should keep in mind when discussing the situation with their customers, friends, and Congressmen.

Number one is that with an approximately evenly-divided Senate, and a thin margin in the House, where all members will be subject to reelection next year, the Eisenhower administration is hardly in a position to do anything but ask, persuade, discuss, and hope.

Bluntly, the guiding factor in the final decision must be politics. Since there is nothing wrong with public desire for a balanced budget, lower taxes, and a strong national defense, such a statement should not be construed as critical of anyone. It just looks the facts in the face.

Congressmen and Senators anxious for reelection — however constructive a man's public service, he cannot be a statesman in Congress unless he's politican enough to be elected — must weigh the relative importance to the public of tax adjustments, a balanced "cash budget" and a nearly-balanced "administrative budget," and large defense outlays, and undoubtedly will come up with a series of compromises.

But before they start that, the administration — equally anxious to have its supporters present on Capitol Hill when the 84th Congress opens — must attempt to find answers to the same questions before it sends its budget, and the tax revision bill expected, to Congress for its consideration.

In that light, and with those qualifications, the following is about the way present thinking runs:

Corporation income taxes — There is no doubt that, in terms of prospective government spending and the absence of other sources of revenue, continuation of the present 52% corporation income levy rate is badly needed if the budget for the fiscal year starting next July 1 is to be brought anywhere near into balance.

The corporation income tax brings in a great deal of money, and is far more politically palatable than any new impost which could be devised to offset the revenue loss.

However, the tax rate automatically drops to 47% next April 1, unless Congress takes affirmative action to peg it at a higher level. A number of Congressional leaders believe strongly that the present rate stifles business, and will not cheer when the administration almost inevitably asks for continuation of the 52% rate.

Thus there is growing talk of a compromise at 50%, retaining three-fifths of the money which would otherwise be lost by the automatic cutback, and at the same time giving part of the ground asked by some of the Congressional leaders.

Excises — Here the picture has some similarity to the corporation tax issue, since there are a number of existing rates which would be auto-

matically reduced April 1. By one of those quirks which makes Washington a frustrating place either to live or to visit, however, these are not the rates on essential goods and services, but on such items as liquor, beer, cigarettes, and others.

These presumably will be extended at their present levels, but as far as government tax planners are concerned, that is not enough — from somewhere must come revenue to counterbalance the loss from the 10% average personal income tax cutback taking place Jan. 1.

The result has been talk of a manufacturers' excise, which immediately produced swarms of protests from a wide variety of people, including some prominent Republican legislators. A manufacturers' excise could be described rather effectively as a not very well hidden sales tax, and thus would hardly look very attractive to an incumbent Congressman casting his vote on a pending tax bill.

This leaves about one possibility, short of a discovery that the government really can get along on several billions a year less than anyone now believes — an overhauled excise structure, in which much emphasis would be on finding new items to tax, rather than removal or reduction of inequitable existing levies.

In the hodgepodge that is our present excise system, there are quite a number of items in the luxury class — or at least which don't qualify as bare necessities — carrying no excises at present, it is pointed out. From them, it is hoped, will come some of the offsetting revenue needed.

All of these things do not add up to too much comfort for proponents of repeal or reduction of excises on such necessities as telephone service. With the emphasis on more money from a broadened excise structure, rather than elimination of inequities, tax reduction sponsors will have very hard going.

One other item is adding to the gray hairs of excise repeal or revision proponents. Once the tax structure is overhauled, it is apt to be with us for a long time, unless a war emergency results in pushing the rates even higher.

Social Security taxes — This may be another hard-fought battleground in the upcoming session. The tax on employer and employe, under existing law, rises to 2% each starting Jan. 1, from the present 1½ each. Holding the tax at the present level would take specific Congressional action.

At present, there is no clearcut agreement as to whether Social Security fund reserves are adequate from an actuarial standpoint or not. The findings of a House Ways & Means subcommittee now studying the subject may shed some light, but the chances are that everyone will not agree with its conclusions.

Two opposing political considerations are obvious. The first is that the administration, presumably giving up on balancing the administrative budget in the foreseeable future, still wants to balance the cash budget, in which Social Security revenues are counted. The administrative budget, roughly, consists of tax revenues against appropriations, whether for the current year or a future period, while the cash budget measures actual federal income and outlay, including payments into and disbursements from such trust funds as Social Security. Since Social Security intake is running far ahead of outgo, this helps in the cash budget, and a 2% levy on employer and employe will help that much more.

Very much in the picture on the other side is the fact that, for millions of wage-earners in the low-income brackets, the Social Security boost will cancel out their savings from the lower income rates taking effect Jan. 1.

If pressed, this column might forecast a 50% corporation income tax after April 1, and a reduction in the long-distance excise levy to the 15% rate imposed on local telephone service and telegrams.

Coming Conventions

Georgia Telephone Association, Henry Grady Hotel, Atlanta, Nov. 16 and 17.

Oklahoma Telephone Association, Biltmore Hotel, Oklahoma City, Nov. 19 and 20.

New Rural Telephone Policies Taking Shape

THE POLICIES of the Eisenhower administration in the rural telephone field, as outlined by the Agriculture Department and Rural Electricification Administrator Ancher Nelsen, are gradually being shaped and made apparent to the public.

Mr. Nelsen, who has expressed himself on REA policy in a variety of ways, including his address to the U.S. Independent Telephone Association annual convention, a few weeks ago permitted issuance of a statement on interest rates, in response to questions submitted by reporters.

In brief, REA is against an increase in the present 2% interest rate for rural telephone and electrification loans.

It has been pointed out at times in the past that it may ill behoove the government to lend money at 2% when it is paying 3½% or more to get the same funds, with an obvious out-of-pocket loss. The reporters' questions stemmed from a report that the Budget Bureau had asked the Agriculture Department to reexamine its lending policy on just that basis.

Mr. Nelsen's reasons for opposing an interest rate rise were as follows:

Telephone borrowers generally have a "thin operating margin at best," and since an estimated 57.5% of the nation's farms do not have telephones, a boost in interest rates would "badly" hamper the big job ahead.

The remaining farms in the nation without electricity — 9% — are the "most difficult to reach," and this would be "even more difficult" if interest charges were hiked.

Looking at the overall 18-year experience of REA, and the interest rates formerly prevailing when the federal government borrowed money, the government has suffered no loss from the 2% interest rate. This calculation, of course, does not encompass REA administrative costs, and is limited solely to what it cost the government to borrow the money lent by REA.

Senator Schoeppel Denounces Government Encroachment

AS PART of an address in which he deplored the encroachment of the federal government into fields normally reserved for private enterprise, Senator Andrew Schoeppel (R., Kans.) has declared that the "government is in the telephone business

Please Turn To Page 76

"Good Service and Making Money seem to go right together and certainly both things are not impossible for the small companies."

BREAD AND BUTTER ECONOMICS

By T. A. SAUNDERS
President,
Union Telephone Co.,
Owosso, Mich.

ECONOMICS is not a very simple thing. It's like the telephone business. There are problems in it and the basic problems, economically speaking (so the economists say) are these two things: that human wants are insatiable; that people want all kinds of goods, services, and things of every description; and, second, that those goods and services are limited. It requires effort and work to produce the thing. The economists further tell us that getting the people to produce these goods and services is the primary problem; that the method of distributing them is the secondary one.

They also say that we can make progress on our economic problems in two ways. One, by increasing the production — the so-called positive approach; that is, doing something about it. The second way is by decreasing the desires of people. That's the negative approach, so they say. The latter, in the last several hundred years, has been found not to be so practical. People don't like it. They are happiest when making some progress towards the satisfaction of their wants. Being in the telephone business we can say, first hand, that we haven't been too successful in any efforts that we might have tried to reduce the desire of our customers for more telephone service. It hasn't been successful as far as we're concerned.

Increasing Production

THE answer, obviously, is that it's necessary to increase production. To do that, they say there has to be some form of incentive to make people work; that they are naturally

lazy, that they would rather sit around in the shade than to work. Second, that we must give them some incentive to assume risk. In other words, they will have to risk something they have in the way of property in the prospect of obtaining more of the same.

There are two ways to do this! One is by holding out the prospect of reward; the second way is to use coercion or force.

You can use the simile of a donkey. The driver is trying to get some work out of the donkey. He can hold out a carrot and teach the donkey that after he does a certain amount of work, he's going to get the carrot. Or, he can keep prodding at the donkey with a stick, or beating it with a stick. That's coercion or force. Sometimes, a combination of the two might be necessary or desirable.

The next thing, economically speaking, is to direct production towards the goods that people want and desire and that immediately raises the question of who is to do all this directing and in what way are they going to direct it.

In our free enterprise system we have a way to do that. That is our pricing system. It solves many of these questions by giving the incentive, in the form of profit, to those who produce what the people want and desire. This pricing system encourages the use of plentiful goods by having low prices for them; discourages the use of scarce goods by higher prices. The system does give incentive all the way through and tends to balance production in the long run. It's not a perfect system but it's more perfect than anyone has found through history. This system does this job with less infringement on the personal rights and individual freedoms of the people than any system ever known.

The Telephone Business

BUT, let's leave the field of pure economics and go into the "bread and butter" brand of the telephone business. By all these economic laws, we certainly have a product that people want. It certainly is in demand and in the natural course of events our prices would be rising very, very rapidly. Our product is scarce in some locations and everyone wants it. But, there's one fly in our ointment in that we're regulated.

"The public has shown it is willing to pay for the type of service it wants."

Our prices are subject to control by the Michigan Public Service Commission. Once again we can use this donkey simile. Obviously, the poor telephone company would have to be the donkey and the Commission would be cast in the role of the driver. They're faced with a problem. They're faced with a problem of using the stick in denying these increased rates or using the carrot as an incentive in granting the companies good rates. You understand what they're trying to get out of this donkey — the telephone company — they're trying to get him to produce the right quantity and the right quality of telephone service. So, they can use the carrot or the stick method, whichever they choose, and they have a problem in deciding which is proper. But, I'd like to go on record as saying that if I were a donkey, I would prefer the carrot method!

Coming back to telephone problems; our problem for both large and small companies is basically to serve our customers and make some money in the process. The larger companies have this problem the same as anybody else but they do have the means of solving it. They have their staffs of accountants, and engineers, and attorneys and they know where they stand as far as their return is concerned. They might not always get the return on investment that they would like to have but they are not losing money. That doesn't mean that the small companies can't do the job. Many have done an outstanding job in this respect. Others are in the process of doing the job.

I'm struck constantly with the fact that good service and making money seem to go right together and certainly both things are not impossible for the small companies. If the rates in a small company are too low they're not getting enough revenue. They can take the negative approach and cut some place — cut in what they are going to pay out. If they cut it would have to come in one of these ways: In what the owner receives in wages and return on his investment.

At the same time, these owners are faced with a cost of living that's substantially higher than it has been at anytime in the past. The second way would be reduced maintenance on telephone plant. The third way, reduced funds available for replacement of telephone plant. The last two methods are negative ways of approaching that problem. They will affect the service the customers will get and, in turn, will make the customer less willing to pay for the service he's getting.

Adequate Rates Are Essential

THE BASIC economic fact for the telephone business is that the public has shown clearly that it is

willing to pay for the type of service it wants. The evidence in that respect is overwhelming. So, it brings us down to the point where adequate rates are essential. They are necessary to give the owner an adequate compensation for his time and investment in the business and to give the customers adequate service.

But, one other thing is necessary — the books and recods of the company must show the need. For the books and records to show this need it's necessary that good accounting procedures be in effect. A uniform system of accounts has been adopted by the F.C.C. and the Michigan Public Service Commission has adopted that as its own system. It's a method whereby all companies keep their books and records in the same uniform way.

The system has two fundamentals. The first is the distinction between operating expenses and capital charges. In covering this, we're going to attempt to simplify it and the pure accountants among you might say I am guilty of over-simplification but from the practical standpoint, I don't think so.

First, the distinction between operating expenses, and capital charges. Operating expenses, at least the major ones, are these: The maintenance of telephone plant, operator wages, stationery, commercial expense — billing and collecting from our customers, our accounting expense, if we have any. Some of the small companies have been guilty of not having any. In the case of the owner and some of his employes in the small company, their time and expense might be split among all those items that I have just enumerated. In addition, major operating expenses are taxes and interest. Last, but not least, the appropriation for depreciation. That is a charge to operating expense to offset the gradual wearing-out of plant and to provide the money to replace it when it does wear out and become obsolete. It's usually expressed in a percent of total investment in telephone plant. About 4 percent is normal.

The appropriation for depreciation only provides funds for replacement of plant on an original cost basis — the original cost of that plant when it was put in service. Most of our plants were put in during pre-war dayse when costs were substantially lower than they are today. It takes more than we're getting in depreciation funds to replace that plant today. The plant for growth for adding subscribers requires all new capital. On this basis of depreciation on original cost, there is a very good case for basing depreciation on replacement costs.

It would help to reduce the further requirements for capital for expanding and improving telephone plant. The requirements of telephone companies — all telephone companies, big and small — for new capital is tremendous. It is our biggest problem. I don't see how our government — the Treasury Department people are involved in the depreciation regulations — I don't see how they and the Commission can continue to ignore the problem of depreciation on original cost. I think there's a very sound argument and a good case for basing depreciation on replacement cost.

The second accounting fundamental is the further distinction between maintenance and depreciation. Maintenance is the replacement of minor items of plant — such as the switchboard, cords and plugs, and the repair parts for instruments, etc. It's an important operation for good service. Depreciation, or charges to capital accounts, are for replacement of major items of plant, such as a pole, a span of cable, a switchboard position, complete telephone instrument, and units of that nature. There is a standard list of units of plant that is a part of the uniform system of accounts. New plant added to serve new customers is also a charge to the capital accounts and is in addition to the owner's investment.

So, the main job in an accounting system is to separate operating expenses from charges to the capital accounts. And, coming back to adequate rates, to be adequate they would then have to meet all the reasonable operating expenses and that includes plant maintenance, and I mean good plant maintenance. The second thing is to meet all the depreciation charges. Third, is to provide a return on the investment.

. Again, there is very, very strong support for a 10 to 12 percent return on equity capital as necessary to keep getting the tremendous amount of funds necessary for growth of the telephone industry. The next thing on this adequate rate question is to be sure that all operating expenses are included, particularly with the small companies, particularly wages for all services performed and that includes wages for managing a company. If the wife or any members of the family do anything in the way of billing and operating the switchboard, or collecting, they should be compensated for it. In some cases, it isn't possible for a company to pay such items in cash, but the owner should make the charge in his records. He can take a note, or some other evidence of indebtedness and get it included as part of his cost of doing business.

It's those things that are necessary to show the need for fully adequate rates and your records must show the cost. The only way to do it is to have a proper accounting system. There are accounting firms which specialize in doing this type of work for small companies. The Association Secretary can help you if you don't already know those firms. The second way is to do it yourself. We have forms available; the job isn't too tough. If you get interested in it, I am sure you could do it.

Economically speaking, your "bread" will have much more "butter" on it if your customers are getting the kind of service that makes them willing to pay all the costs of it. — (*Mr. Saunders presented this address at the* 1953 *Convention of the Michigan Independent Telephone Association.*)

Debt

"All we can say is, that if a large debt is a national blessing we seem to be well on the road toward eternal bliss in this country! We wish we could believe it."— Hagerstown (Md.) Morning Herald.

Santa

"We must face reality— and not expect our government to play Santa to all wants and needs." — Freeport (Pa.) Journal

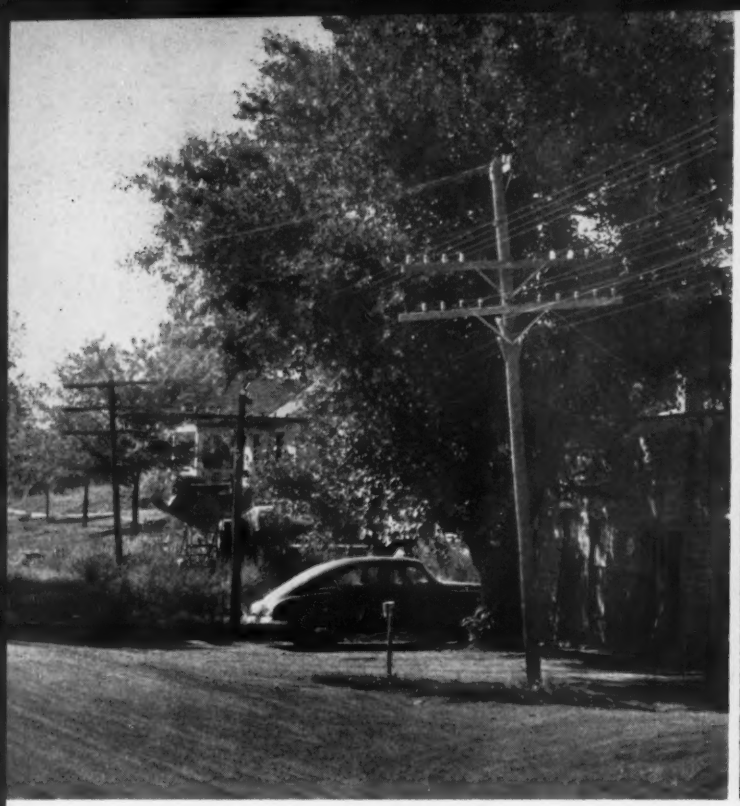


FIGURE ONE — Telephone open wire in town is exposed to hazards of contact with power lines and street lighting circuits.

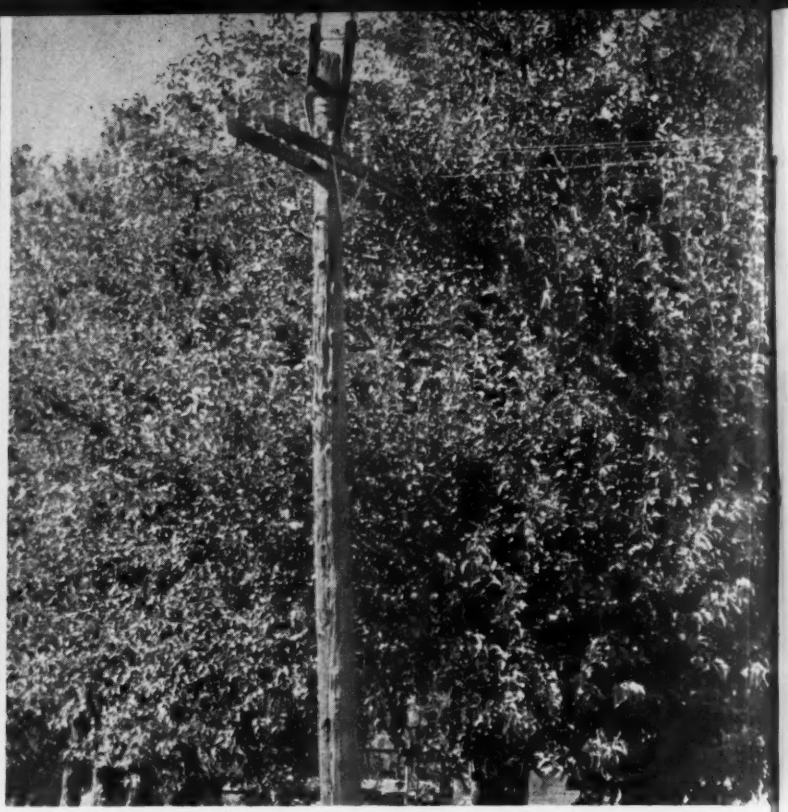


FIGURE TWO — Maintenance costs are greatly increased when open wire must go through shade trees in town.

CABLE PLANT CONSTRUCTION

By JOHN S. REED

In Part One of his new training course Mr. Reed discusses — (1) Cable Plant Versus Open-Wire Plant, (2) Cable Design Considerations, (3) The House Count Map, and (4) Cable Laterals and Terminals

Cable Plant Versus Open Wire Plant

TELEPHONE circuits connecting subscribers to the central office are carried in cable or open wire. Open wire circuits are generally employed in areas of low population density such as rural districts and outskirts of towns. In these locations, the circuits are relatively few in number and are spread out over a large area. The long circuits and the scattered locations of the subscribers call for the use of relatively heavy gauge bare wire carried on insulators attached to poles. To reduce the number of lines to a minimum and thus keep down construction and maintenance costs, only party lines are used, and each line provides service for eight to ten subscribers. Each station is connected to the main line by open wire spurs or by drop wire runs, depending on the distance.

In locations of greater population density, the increase in the number of circuits beyond a certain point would result in high maintenance charges. There would be a large number of bare wires exposed to damage by storms, interference from trees, and hazardous contacts with power distribution and street lighting circuits, as depicted in *Figures* 1 *and* 2. This was the situation in the early days of telephony when the growing number of open wire circuits produced a tangle of overhead wires in business districts of large cities. At one time in New York City, bare wires were carried on as many as twenty-five crossarms attached to 90-foot poles! The threatened strangulation of the infant industry was averted by the development of lead covered cable with paper insulated conductors and twists every few inches in each pair to eliminate cross talk.

This development has enabled a large number of conductors to be compactly bunched within an airtight covering. This protecting sheath is impervious to the weather elements. At the same time, the relatively small diameter of the cable greatly reduces the chance of contacts with overhead power or street lighting circuits and makes tree interference of

far less consequence than in the case of bare wire circuits spread out on crossarms. These advantages are indicated in *Figures* 3 *and* 4.

Cable Design Considerations

THERE IS NO question as to the economy and desirability of placing telephone cable in towns where the population density is comparatively high. In villages and areas of low population density, an economic study may be required to justify installing cable rather than open-wire circuits. The following points should be considered in deciding whether to place cable or open wire. —

(1) *Within town limits*, it is not considered desirable to carry more than five circuits in open wire along a lead; that is, one crossarm of wires is all that should be permitted, particularly when joint construction with power or street lighting circuits is involved, as indicated in *Figure* 5. In some places, it may be possible to substitute 6-pair plastic sheathed cable, or 5-pair rural distribution cable for open wire, especially where tree interference is a serious problem.

(2) *Telephone circuits* should enter the central office through cable, preferably underground, even if only a short section would be required to the "office pole" (*Figure* 6). The use of bridle wires carried on messenger for bringing the circuits into the office is not considered a good practice.

(3) Cable should be placed where farm circuits along a lead would exceed 15 in number, in order to avoid carrying more than three crossarms of farm circuits in the rural and toll lead. The length and conductor size of the cable, however, should be carefully selected to meet transmission requirements. Some companies place a limit of ten farm circuits in open wire. This practice, however, may result in longer farm cable leads than desirable for satisfactory transmission.

Even though the study may show it to be more economical to install open wire in a village, considerations of civic pride may compel the placing of cable. In some cases, town ordinances may require that cable be placed underground, usually in the business section.

The study should also take into consideration such factors as the initial costs of placing the cable, the cost of future additions due to population growth, salvage of material recovered from the old plant, and depreciation of the cable plant. The study may show that it would be more economical to place open wire initially and then replace it with cable at some future time when growth warrants it.

When it is decided to install cable plant, careful design of the new plant layout is very important. It should be kept in mind that cable is not capable of being added to, a circuit at a time, like open wire. If additional circuits are needed and no extra pairs have been provided in the cable, the cable must be replaced with a larger one, or additional cable must be installed, resulting in needless expense. The cable layout should be designed with a reasonable number of spare circuits that can be used to provide service to new subscribers

FIGURE THREE — Cable makes for neat appearance and is well adopted to joint use with facilities of other public utilities.

"CABLE PLANT CONSTRUCTION"

This new and up-to-the-minute training course has been completed for exclusive publication in TELEPHONE ENGINEER & MANAGEMENT by Mr. John S. Reed, one of the industry's leading telephone engineers. The course has been written in easy-to-understand language. It is profusely illustrated with drawings and illustrations. It thoroughly covers all phases of cable construction from a comparison of the merits of Cable Plant versus Open-Wire Plant right through making the original plans, building the Cable Plant together with instructions on maintenance of the plant after it has been completed.

This course should prove valuable to old time cable men as well as to men just entering this phase of the business. It will serve as a valuable reference book encompassing the latest and most efficient manner in cable construction and maintenance . . . and prove most useful for companies desiring to conduct training courses among present employees. The course will appear monthly in chapter form until the course is completed. At the end of each chapter Mr. Reed has prepared a series of questions for the student to answer in order to review his studies. These questions have been prepared to aid both the individual student or an entire class of students.

See Ad Describing Course on Page 100.

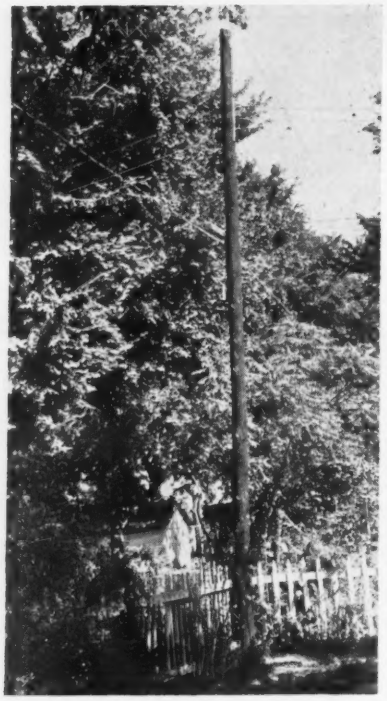


FIGURE FOUR — Trees are no problem when cable is placed along lot lines (vacated alley) as wood molding can be used to protect the cable.

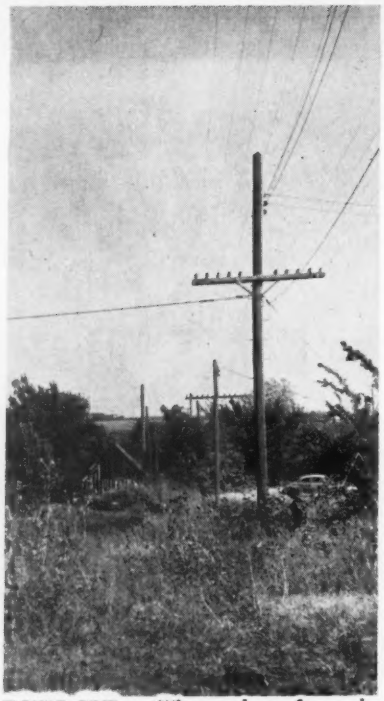


FIGURE FIVE — When only a few subscribers' circuits are needed as in town outskirts, it is satisfactory to carry up to five circuits in open wire in joint or non-joint construction.

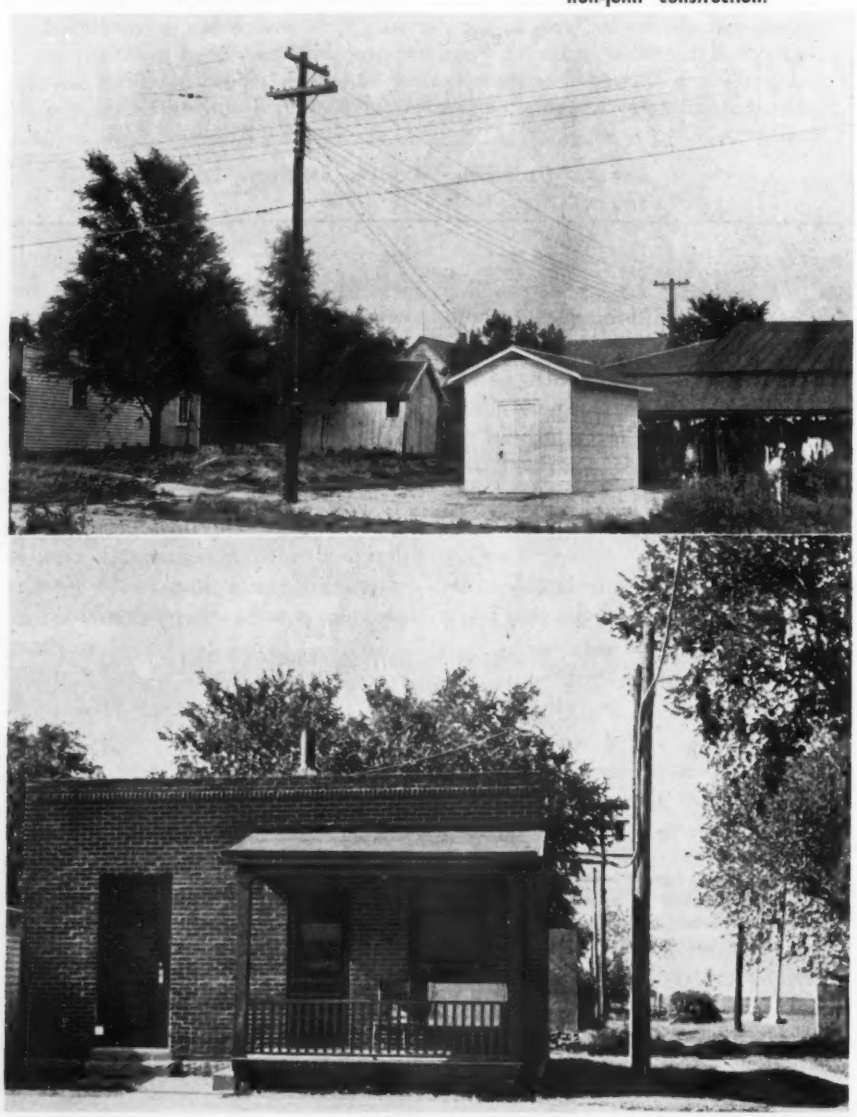


FIGURE SIX — (left) The present trend is to underground entrance cable as depicted in the upper illustration rather than aerial cable entrance shown in the lower photograph.

over a period of time and to replace defective pairs. The layout should also be made sufficiently flexible to take care of shifts in subscriber station development within a reasonable degree.

House Count Map

THE HOUSE count map is a very useful tool in the initial stages of cable planning. Such a map is valuable for determining the number and the locations of present subscribers and prospects for telephone service. With this map, it is also possible to visualize the areas and probable directions of population growth.

This map may be copied from a town plat obtainable from the town or county engineer's office. As indicated in *Figure* 7, the map should show the streets and alleys, railroads, and rivers. If possible, it should be large enough to show the lot lines, as this helps in counting the number of present and prospective subscribers.

The house count map indicates the location of the central office at the approximate wire center of the exchange. In the average sized town, this location is generally in the business section, on a side street just off the main thoroughfare, where land costs and real estate taxes are not so high.

The locations of the present and prospective subscribers are shown on the map. A field survey is usually necessary, to accurately locate these people, though the addresses of regular subscribers may be obtained from the subscribers' card record.

Because of population growth, there will be additional prospects for telephone service in the future, and a certain number of extra pairs in the cable should be reserved for assignment to new subscribers. Since the rate of this growth is an uncertain factor in different communities, good judgement and familiarity with conditions in the area under study are requisite in determining the number of extra pairs to provide in the cable design. In addition, there should be reserve pairs for temporary use while trouble is being cleared in working pairs, also for permanent

replacement of bad pairs that cannot be repaired.

The following general guides may be applied in arriving at a reasonable estimate as to the number of extra or vacant pairs to provide: —

(1) *For the average sized town,* the rate of growth is fairly slow and a reasonably safe margin may be obtained by allowing 25 percent additional pairs over the number of pairs allotted to present and prospective subscribers, with no reduction for party line subscribers in town. This would correspond to an initial cable fill of 75 percent.

(2) *In areas where the town growth* is relatively stable and there are a large number of party line subscribers in the town, the figure representing the number of these subscribers probably should be reduced approximately one-third, to avoid an excessive number of vacant pairs.

(3) *When a town is experiencing rapid expansion,* and a high ratio of telephone subscribers to non-subscribers is expected, an estimate based on one cable pair for every lot in the area under study probably will prevent premature congestion of the cable system. In this case, no adjustments are made for party line, rotary line (trunks to same subscriber), or P.B.X. subscribers.

Another factor that complicates cable design is the direction of population growth. Especially in the large towns, it is difficult to accurately predict the directions of growth, except where rivers, railroads, swamps, or similar obstructions are present to retard the direction of town expansion. Regular contact with the mayor's office, the chamber of commerce and real estate agents may turn up clues as to future real estate or business developments, and enable the telephone company to make plans accordingly.

After all the present and prospective subscribers have been entered on the house count map, the number of subscribers and prospects in each

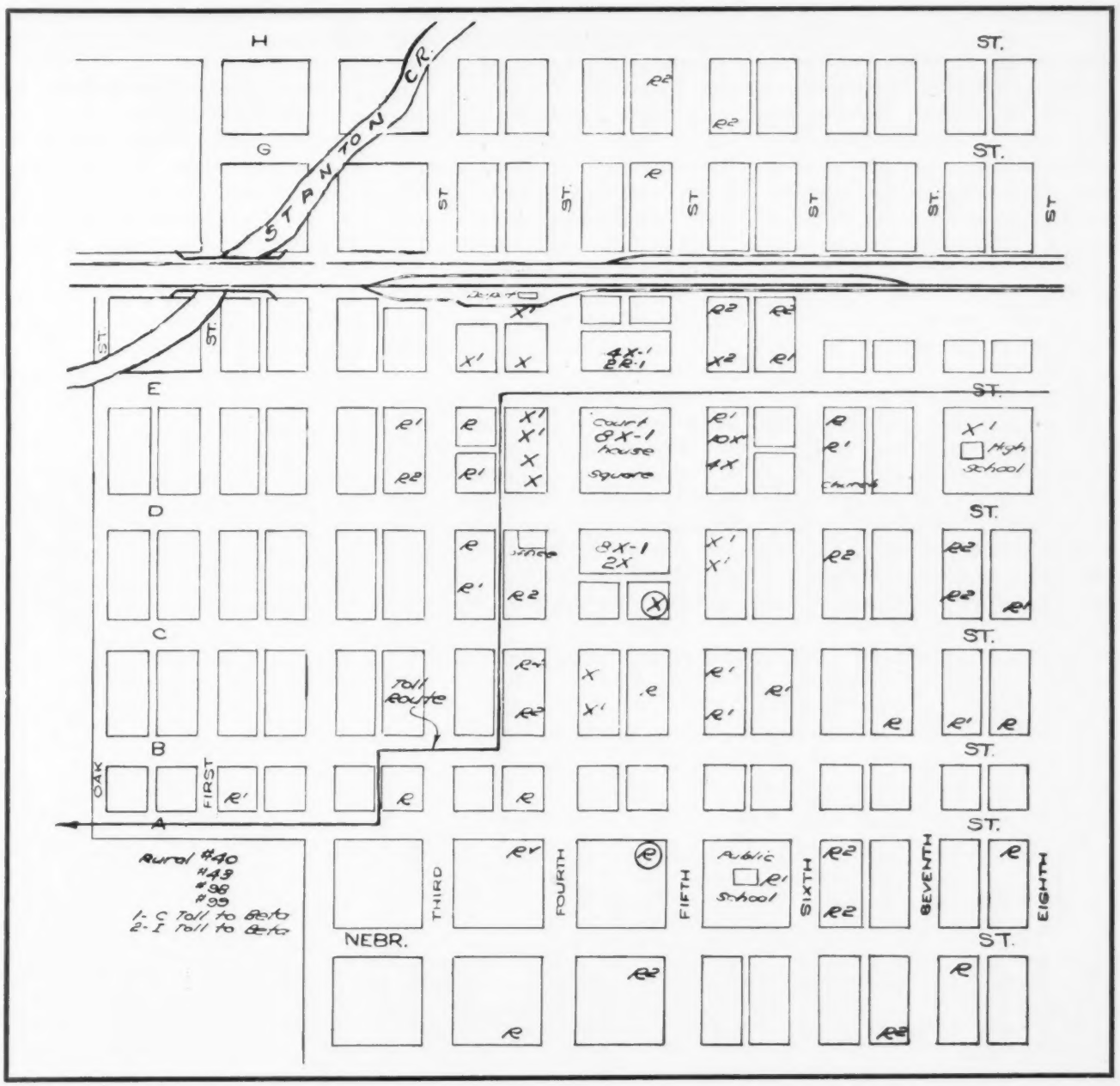


FIGURE SEVEN — A house count map should show streets, alleys, railroads, swamps, and rivers, as well as locations of present and propective subscribers. Symbols are as follows: "R"-residence, "X"-business, "V"-vacant. Subscripts are "1"-1 party, "2"-2 party, "4"-4 party and "10"-10 party. Encircled letters are buildings under construction.

block is written in the block space on the map. These numbers indicate the distribution of the expected subscriber load and thus assists in establishing the route of the main feeder cable through the town.

Where the distribution of the original open-wire spurs from the main open wire route in town is fairly even, this route may also be used for the new cable. This would be an advantage where the existing poles are in good condition and are sufficiently strong to support the new cable. As a rule, however, the old pole plant will require replacing, and then the original route should be relocated if necessary to most efficiently feed the subscribers through laterals.

Determining Location & Sizes of Cable Laterals & Terminals

FROM THE MAIN feeder cable, laterals or branches extend to reach subscribers not on the main route. The lateral cables generally run at right angles to the main cable lead, in alleys or along lines separating lots in the middle of the blocks. In more sparsely settled areas these laterals may terminate in open-wire extensions to connect the few subscribers stations in the area, as illustrated in *Figure* 5.

To determine the number of pairs for the main cable feed, tentative laterals are placed as shown in *Figure* 8. The number of subscribers on each lateral is totalled and the sum is entered near the lateral on the map with a circle drawn around the figure. Starting at the far end of the main cable and going back to the central office, the total pairs from each lateral are added together and entered in circles near the junctions of the laterals. At the central office the total number of present and prospective subscribers indicates the probable number of pairs in the cable that will be assigned for working lines. To this number is added the extra pairs to allow for future growth plus reserve and replacement pairs for use in case of trouble affecting working pairs. Careful study is needed to fit these pair requirements to available cable sizes and conductor gauges.

Cable terminals for the final connection of the cable pairs to station equipment are located at selected points on the laterals and the feeder cable. In small towns, there will generally be one or two terminals in each block, depending on the subscriber density. Many companies have established the practice of mounting a terminal on each pole within the block, even though perhaps only two or three drops would feed out of each terminal. The purpose is to obtain better drop distribution and avoid pole-to-pole drop spans through trees and shrubbery in the alleys and along lot lines.

The size of cable terminals depends on the number of subscribers to be served from each. A general rule is to provide 16-pair terminals when eleven subscribers (ultimate) are to be served and 26-pair terminals for over this number. Some companies specify a terminal capacity approximately equal to twice the number of subscribers and prospects to be served in the area, particularly in situations where 11-pair terminals are used.

While 16-pair is a desirable minimum size, many of the larger companies are using 11-pair terminals in the ratio of about two or three 11-pair terminals to each 16-pair terminal and an occasional 26-pair terminal in a carefully engineered arrangement to assure reasonable flexibility of the cable system. Such an arrangement works well where the terminals are spaced closely together so that each pole in the block has a terminal on it. Six-pair terminals are used on farm cable leads where it is desired to serve rural subscribers along the lead without having to run open wire parallel to the lead for this purpose.

Determination of Cable Sizes — Cable Fill

CABLE SIZES range from 6 pairs to 2121 pairs, with the most commonly used standard stock sizes of cable in small towns being 26, 51, 76, 101, 152, 202, 303, 404, and 606 pairs. Cables in the smaller stock sizes; 6, 11, and 16 pairs, are employed primarily for stubs (between terminals and lateral or main cable). The larger sizes from 909 pairs up are used principally for underground feeder or trunk cables in large towns.

It should be noted that the cables are made up of a specific number of pairs, plus spare pairs. Thus, a 26-pair cable consists of 25 pairs plus one spare, and a 303-pair cable has 300 pairs plus three spares. The spare pairs are provided by the manufact-

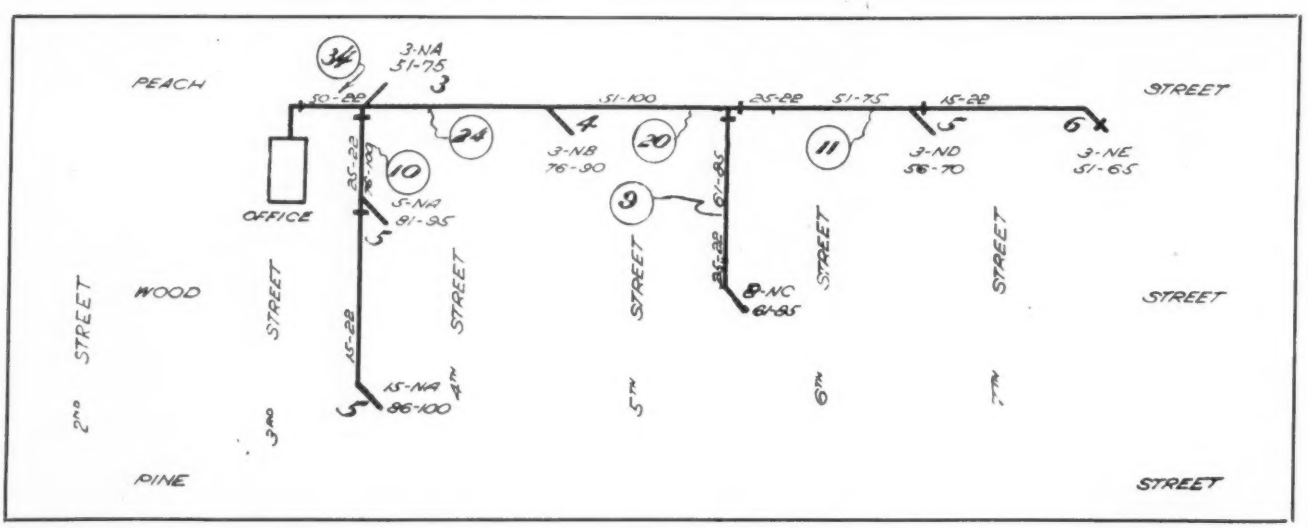


FIGURE EIGHT — Locations and sizes of laterals and terminals are based on number of subscribers and prospects in areas served. Cable fill in this example is 34 ÷ 50 × 100 = 68%.

urer as a guarantee that the customer will receive cable with the full number of good pairs, since it is not always practicable to repair defective pairs occuring at the time the cable is manufactured. As a rule, however, most cables will have all regular and spare pairs in good condition, and these spare pairs may be used for replacing pairs that go bad later on and cannot be repaired.

In addition to the pair requirements on the subscribers load (present and prospective), another factor must be considered. This is the maximum cable fill which is defined as a percentage of the total number of pairs in a cable that can be used and still provide dependable service to the subscribers. Experience indicates that the maximum fill of feeder cables in locations of slow growth should not be greater than 85 percent for the smaller cables, or 90 percent for the larger cables. When this point is reached, plans will have to be made to install additional cable or larger replacing cable.

For economy, the size of the cable selected should be close to the pair requirements plus the extra pairs making up the total fill. The maximum fill includes reserve and replacement pairs for use in case of trouble affecting existing pairs, also pairs left in the cable for future outside terminations.

Ordinarily the cable is designed to reach its maximum fill within a 10-year period, even though the service life of the cable may be 20 years. However, where growth is slow and the cables are small (not over 51 pairs), it is sound economy to plan for a maximum fill at the end of the service life of the cable, at which time the cable can be replaced with a larger size cable. The reason is that the cost of handling and installing the smaller cables is a greater proportion of the total cost than in the case of larger cables.

To keep idle cable capacity at a minimum as the cable lead progresses to its outer end, the cable size is reduced at certain points. It is considered desirable to maintain a uniform cable size of adequate capacity within areas of rapidly increasing subscriber density and to reduce the cable size when the lead passes into areas of slower growth. Diminishing of cable sizes, while assuring economy of investment in cable plant, requires proper multipling of the pairs to provide a reasonably flexible cable count and enable cable relief measures to be taken at the proper time.

Determination of Cable Conductor Size

BESIDES THE number of pairs in the cable, the size of the cable conductors, or the cable gauge as it is usually referred to, is also considered in the cable design. The cable gauge determines the maximum length of cable that can be placed without causing excessive transmission losses. On the other hand, the use of heavier conductor sizes than needed for the length of cable installed may result in a very expensive construction.

Standard cable gauges are Nos. 19, 22, 24, and 26 A.W.G., the most commonly used gauge being No. 24. Formerly 13 and 16-gauge conductors were found in toll cables, but 16-gauge is now used only to a limited extent. Present day cables in toll leads and toll entrances carry 19-gauge conductors that are usually loaded to reduce transmission losses. In addition, high gain repeaters compensate for losses that cannot be entirely overcome by loading.

Factors affecting the transmission losses in cable conductors are the resistance of the conductors and the capacitance of the cable pairs. For dial exchanges with 48 volts central office battery, the generally accepted loop resistance limit for satisfactory performance of the switching equipment in the office and good signalling is 1000 ohms. (Some types of dial equipment will operate on higher loop resistances.) Common battery lines operating on 24 volts are limited to 650 ohms loop resistance.

For 24 and 26-gauge cables, the 1000 ohm loop resistance limits the length of these cables. In the case of 19 and 22-gauge cable, capacitance between the cable pairs further limits the cable length. (*See Table I.*)

Experience indicates that it is possible to exceed the limiting cable lengths to some extent and still obtain satisfactory transmission. For good local transmission in exchanges with 48 volts common battery, the maximum lengths of single gauge cable may be 4 miles for 24-gauge or 2½ miles for 26-gauge, provided that modern, high efficiency anti-sidetone subscriber sets are employed and that the central office equipment will function satisfactorily on cables of this length.

Within the town area, the No. 24 or No. 26 is considered the most economical cable gauge. In the smaller sizes of cable, the 24-gauge costs only a little more than the 26-gauge. Hence, when there is a question as to whether 26-gauge cable will provide good transmission, the 24-gauge cable should be used.

For long cable feeds, 22-gauge cable is considered an economical gauge. However, transmission and signalling may be unsatisfactory on some of the pairs serving the more distant subscribers. To avoid the necessity for going to the more expensive 19-gauge cable the following alternatives may be considered:

(1) *Apply loading* only to the several pairs of 22-gauge cable used for the longest subscriber loops.

(2) *Use composite cable* having a few pairs of 19-gauge and the rest, 22-gauge conductors, the coarser gauge pairs being utilized for the longest loops.

(3) *Install a sufficient length* of 19-gauge cable as extension on the 22-gauge cable serving the nearer subscribers, to overcome the trans-

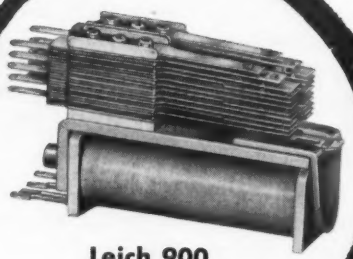
Please Turn To Page 58

TABLE I — Resistance and Attenuation of Cable As Limiting Factors on Length of Cable

Cable Conductor Gauge	Normal Loop Resistance in: Ohms per 1000 Feet	Ohms Per Mile	Maximum Lengths of Cable in Miles Based on: Maximum Loop Resistance of 1000 ohms	Maximum Attenuation Permitted
19	16.1	85	11.8*	4.9
22	32.4	171	5.9*	3.8
24	51.9	274	3.7	3.0
26	83.3	440	2.3	2.3

* This would approximate the maximum length of a cable that is properly loaded to neutralize the capacitance of the cable pairs.

1



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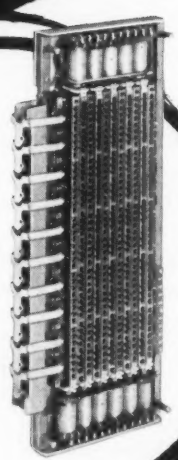

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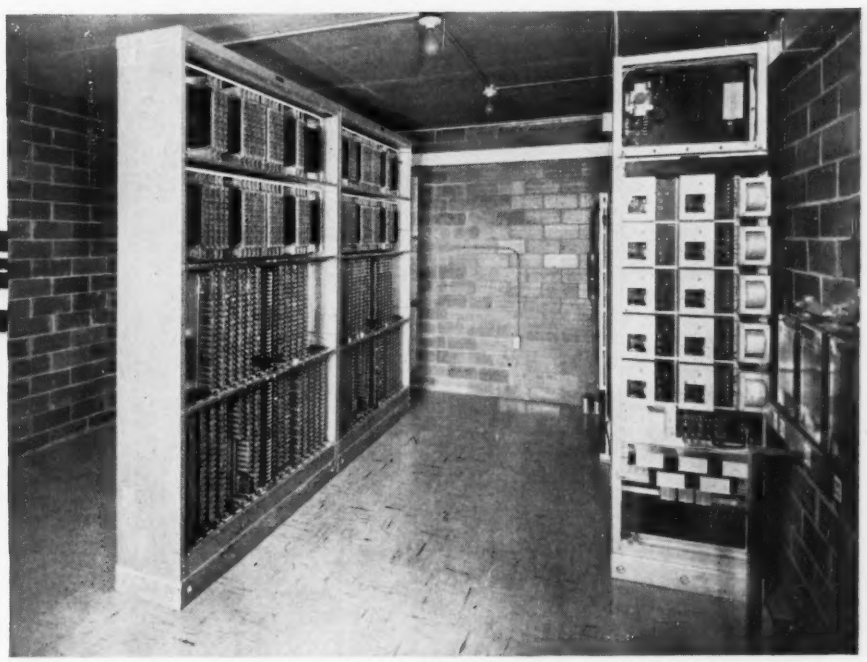

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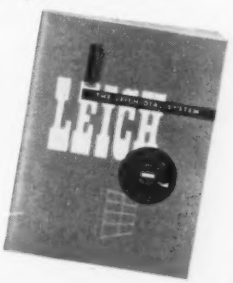

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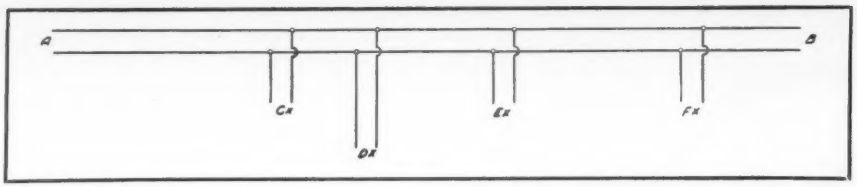


FIGURE NINE — In a cable multiple system, a cable pair terminating at terminal B will have outlets at terminals Cx, Dx, Ex, and Fx at different points on the cable lead.

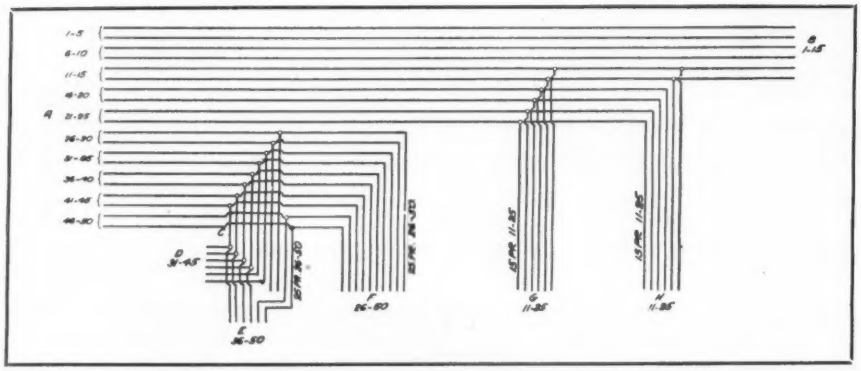


FIGURE TEN — A flexible cable count is obtained by distributing different pair groups in a cable among different terminals along the lead.

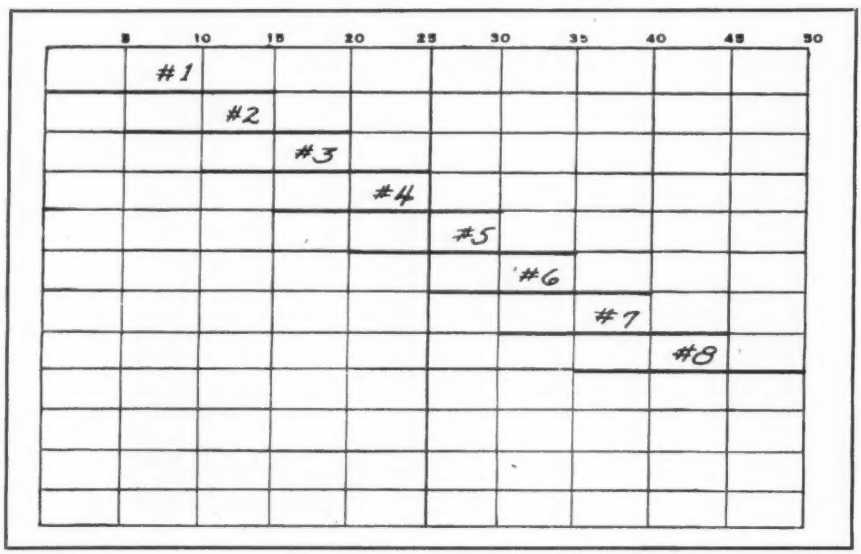


FIGURE ELEVEN — The equal lap arrangement for cable pairs is suited for areas of uniform development.

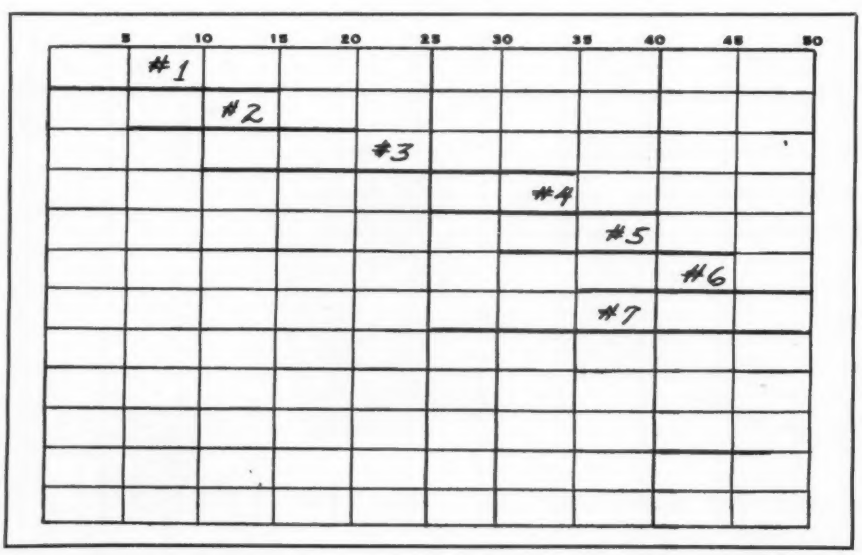


FIGURE TWELVE — For areas fluctuating in subscriber station density, best results are obtained when the cable multiple is arranged to suit the variations in the station density.

mission loss in the pairs feeding the distant subscribers.

In the case of very long loops, such as those serving rural stations, care must be taken in applying the loop resistance limit to the overall line lengths. In general, it will be necessary to use 19-gauge cable, and if the length of this gauge cable will exceed two miles from the central office, it is advisable to make a preliminary transmission study to establish the maximum length of the lines to be served through the cable. Within the limits imposed on the number of open wires that may be carried in the main lead, it is usually more economical to make the length of the farm cable as short as practicable and place open wire from the cable to the rural stations.

When, however, a long cable lead is needed to serve rural stations, copper or *Copperweld* conductors may be used in the open wire feed from the cable and thus reduce the transmission loss to a tolerable figure. The transmission study should also take into consideration the possibility of using a smaller and less expensive cable gauge with copper or *Copperweld* wire in the open wire feed, weighing the cost of one kind of facility against the cost of another.

It was previously mentioned that good local transmission can be obtained even when loop resistance and cable attenuation limits are exceeded. On the other hand, transmission that may be considered quite satisfactory for local connections may fall below the tolerable limit on toll connections. The so called effective transmission requirements under the Working Reference System standard with telephone companies specify a minimum loss of 0 decibel for subscriber loops, and 4 decibels for the tributary trunk to the toll center. In so far as this is practicable, all subscriber lines and tributary trunks should meet these limits. Special transmission loss tables for various lengths of cable of different inter-connecting gauges, with or without open wire connections, are needed for calculating the maximum lengths of the subscriber loops. The larger operating companies are provided with these tables and are generally willing to assist smaller companies having problems of long subscriber loops.

Identification of Cable Pairs — Cable and Terminal Count

AS PREVIOUSLY pointed out, proper multipling of cable pairs is essential to a flexible cable count which is one of the objectives of good cable design. To explain the techniques involved in cable pair multipling, we will first consider the methods by which cable pairs are identified for record purposes and cable layout planning.

At the central office, the exchange cable terminates on the main distributing frame where each pair in the entering cable or cables is assigned a number beginning with "1" at one end of the frame and continuing in sequence until all pairs have received numbers. These pair numbers are called main frame or rack numbers.

The pairs in each cable are identified by a count corresponding to the main frame numbering. Thus, in a 51-pair cable the count might be 1-50, or 51-100, 101-50, according to the assignment in the records. Sometimes a split count occurs; for example, 151-75 + 26-50.

The cable pairs leaving the central office go to cable terminals located along the main and lateral cables. Each pair in a terminal is identified by a number corresponding to the position of the binding posts in the terminal to which the pair connects. This numbering scheme appears in the cable record, but on the cable plat the count is shown by rack numbers of the pairs appearing in the terminal, as for example, 1-15, 6-20, 26-40, etc., in 15-pair terminals.

Cable Multipling Methods

IN CABLE PAIR multipling, each pair has more than one outlet or appearance in certain cable terminals on the lateral and main cables (*Figure* 9). At the same time, the pairs are arranged in such a manner that different groups of pairs will appear in different terminals, as illustrated in *Figure* 10. The effect is to distribute the pairs over a group of terminals. The wider the distribution and the greater the number of terminals involved in the multiple, the more flexible will be the cable count.

On the record, the multipled pairs appear as overlaps in the terminal count. The laps may be equal or unequal as determined by the distribution of the subscribers stations. For residential areas of uniform development where the lots are equal in size, there is an advantage in providing equal laps in the count involving a number of terminals. For example, a 50-pair cable might have eight 15-pair terminals and multiple in cycles of 5 pairs as shown in *Figure* 11. This multipling arrangement enables pair transfers (or "cuts") to be readily made when necessary.

With publication of JOHN S. REED'S (above) new training course on "Cable Plant Construction," school will start in many company central offices; Several managers plan to use Mr. Reed's articles as a basis for their Cable Construction training programs.

Where the areas served are not uniform in development and fluctuate more or less in subscriber station density as is often the case, the cable multiples are arranged to best serve these areas. *Figure* 12 illustrates a multiple of this kind in a 50-pair cable. When properly made up, it enables flexibility and even distribution of the subscriber load throughout the cable count.

EDITOR'S NOTE: Part Two of Mr. Reed's training course will appear in the December issue of Telephone Engineer & Management. In Part II, Mr. Reed will discuss (1) *Types of Cables;* (2) *Sizes of Cables;* (3) *Pole Sizes and Spacings for Cable Spans, and* (4) *Cable Loading.*

In Part III which will appear in the January, 1954 *issue of TE&M, Mr. Reed will discusss* (1) *Materials Used in Aerial Cable Construction;* (2) *Tools Used in Aerial Cable Construction;* (3) *Placing Poles for Cable Leads and* (4) *Placing Messenger Strand.*

For a complete description of Mr. Reed's article see page 100 *of this issue.*

Cable Plant Construction

Questions On Part One

Questions on — Cable Plant Versus Open Wire Plant; Cable Design Considerations; House Count Map; Determining Location and Sizes of Cable Laterals and Terminals; Determination of Cable Sizes — Cable Fill; Determination of Cable Conductor Size; Identification of Cable Pairs — Cable and Terminal Count; Cable Multipling Methods.

(1) Where is open wire generally employed? Cable?

(2) In certain areas an economic study may be required to determine the feasibility of placing cable. What would be the determining factors?

(3) What information does a house count map give?

(4) Enumerate the general rules that may be followed in estimating the number of vacant pairs to be reserved in new cable.

(5) Explain how the number of pairs for a main cable feed is determined. What general rules would you apply in selecting terminal sizes?

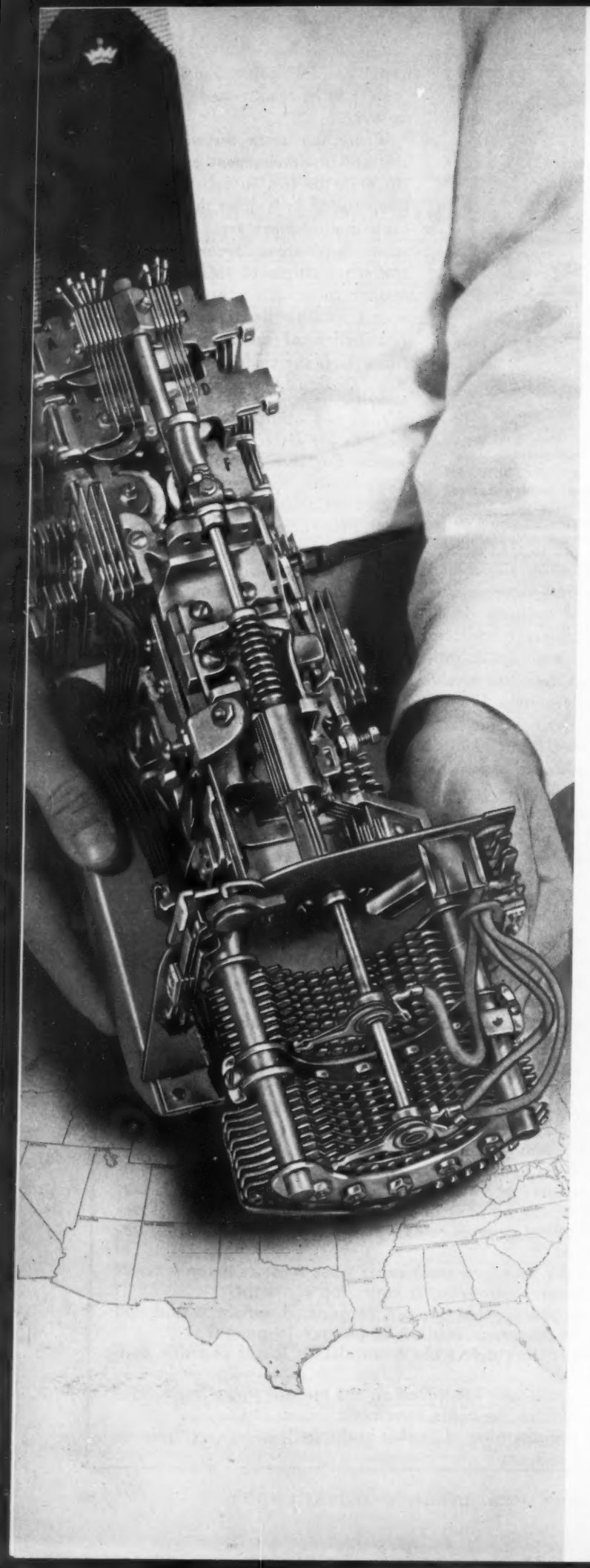
(6) What are the standard stock cable sizes most commonly used? Define a spare pair. What is meant by cable fill?

(7) List the standard cable gauges. In general, where would you use 24 and 26-gauge cables? 22-gauge? 19-gauge?

(8) What two factors affect the transmission losses in cable conductors?

(9) How is a cable pair identified on the main distributing frame? In the cable? In the cable terminal?

(10) Explain the meaning of "cable multiple."



Look how easily Strowger Automatic converts to Universal Numbering!

Thanks to the "2-5" Selector Switch, Strowger Automatic exchanges can convert simply and economically to the seven-digit numbering plan required for Nationwide Subscriber Toll Dialing.

When Universal ("2-5") Numbering comes, many telephone men will be faced with having to use seven-digit numbers in exchanges which would normally require only four or five digits. For some, this will be a problem with a costly solution. For owners of Strowger Automatic exchanges, Automatic's engineering has provided a simple, economical answer: the "2-5" switch.

How It Works

The "2-5" switch is a selector which "absorbs" from seven-digit numbers those digits not needed for actual switching purposes. Several models are available which can absorb two or more digits with or without line lockout and conversation timing. Here's a typical example of the way the "2-5" switch works in an exchange which would normally require only five digits: Let's assume that one of your new seven-digit numbers will be HAmilton 2-4559. As a subscriber dials the digits H and A, the "2-5" switch will rise and drop back. Then, as he dials the digit 2, the "2-5" switch will rise and cut in —thus trunking through to switches which proceed with the actual switching of the call. (For local calls only, you may, if you wish, advise subscribers not to dial the letter digits as they are not needed for such calls—a point which simplifies dialing.)

Repeated Absorption Brings Savings

By **repeated absorption** of digits, the "2-5" switch does the work of several ranks of switches which would otherwise be required—effects a substantial savings in equipment.

All Levels Available for Local Switching

One of the most important features of the "2-5" switch is that levels representing **absorbed digits** in your office code can subsequently be used for local area switching. (Note that in HAmilton 2-4559 the digit 2 represents a re-use of the A (2) level.) The "2-5" switch thus gives you full use of all levels for active trunk groups.

Solves Many Short-haul Toll Problems

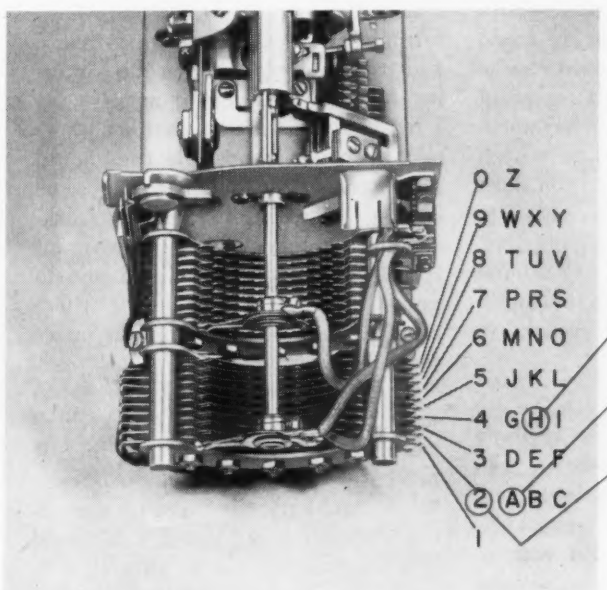
Another point in favor of "2-5" selectors is that they can perform many intricate switching operations required in short-haul toll networks and thereby eliminate the need for costly common control equipment such as registers, translators, and senders. In a network of local exchanges, the "2-5" switch permits using a universal directory for local calling as well as for calling into adjacent areas on an extended area basis.

Installation Is Simple

If you are ordering a Strowger Automatic exchange now, your most practical move is to order "2-5" selectors as original equipment. If you already have a Strowger Automatic exchange, you'll find it's simple to replace your present first selectors with "2-5's." There's no rewiring or conversion of existing switches, shelves, or banks. Moreover, you can re-use your present 1st selectors as 2nds or 3rds as expansion is needed—another substantial economy.

"Pay-as-you-go" Plan

Many owners of Strowger Automatic exchanges are financing their conversion to Universal Numbering easily by buying "2-5" switches for use as regular selectors as expansion requires (the "2-5" feature to be activated when needed). Get full helpful details on the many applications possible with "2-5" switches. Write for Circular 1807 today.



How The "2-5" Switch Works In A Five-Digit Exchange

(Assuming called number is HAmilton 2-4559)

- Subscriber dials H — switch rises and drops back
- Subscriber dials A — switch rises and drops back
- Subscriber dials 2 — switch rises and cuts in — trunks through to local switches.
- Subscriber continues dialing rest of number and balance of switches proceed with actual switching of the call. (Note that digit 2 represents re-use of A (2) level.)

and remember—

month by month

Strowger Automatic installations exceed all others

AUTOMATIC ELECTRIC

Originators and Developers of the Strowger Step-by-Step "Director" for Register-Sender-Translator Operation . . . Machine Switching Automatic Dial Systems

Makers of Telephone, Signaling and Communication Apparatus • Electrical Engineers, Designers and Consultants

Distributors in U. S. and Possessions: AUTOMATIC ELECTRIC SALES CORPORATION
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Small Company Talk

By BILL CORMAN

Rural Carrier Equipment Deserves Attention From Company Owners

"Rural carrier promises to take a big slice off the high cost of providing rural service and it may take a small slice off of the low revenue difficulty."

HI, NEIGHBOR! One of the newer developments in the telephone industry is the rural line carrier. I have been hearing rumors about the development of this piece of equipment for well over a year, the rumors getting more and more definite until, just a few days ago, a form letter came to me, as it did to probably most other Independents, setting forth prices and delivery dates.

Without mincing words, it has seemed to me that, with a few admitted "if's" in the picture, the development of a good, reasonably priced rural line carrier system, would do more to solve the rural problem than almost any other idea or development of the past several years. For it goes without saying that if you can furnish the same service over less expensive plant, or furnish better service over the same cost plant, you are taking a step in the right direction. The cry against rural service has always been that it is a high-cost, low revenue producing part of the telephone business. The rural carrier promises fair to take a big slice off of the high-cost objection, and it is conceivable that it may also take a small slice off of the low-revenue difficulty.

The principal difficulty with rural line carrier is that few of us know anything about it. Admittedly, however, it is an adaptation of the same idea that has long been used in long distance carriers, and which have certainly proved their worth and value beyond all doubt. But the rural carrier is relatively new, and what we don't know about it far outweighs what we do.

If the demand for rural development were not so insistent, we could all sit back and wait for someone else to prove it in, I mean all we small companies. But most of us have people in our rural areas who have been on our necks too long now, and most of us want to get those folks satisfied, if humanly and economically possible, just as soon as we can. It follows then, that a lot of us will be seriously considering rural carrier systems in the very near future.

"Can I Afford it?"

ONE OF THE first questions we are all asking ourselves is, "Can I afford to buy it?", meaning, "Will it cost me less to serve my rural territory with carrier or with conventional wire lines?" And when we say "cost," most of us are thinking, at least initially, of "original cost." Original cost is not, however, the whole picture. Depreciation, obsolescence, and maintenance costs are of prime importance also. But, to get a starting point, and assuming for the moment that the other cost factors will pan out relative to the original cost, let's see if we can answer our question, "Can I afford it?"

After giving the matter considerable study, I believe that each specific case of possible use must be put to the test. It is possible, as I proved to myself, to develop feasability formulas, but the application of those formulas was so complicated that I had trouble applying even the formulas that I worked out for myself. So I fell back on the idea that each specific instance of possible use should be tested out, on paper, to get some idea of the feasability. After working out a number of these specific instances, you will, as I did, begin to get some general idea as to where and how and if carrier might prove feasable.

The situations that I started to work on first were those areas where we have no service and no lines at present — completely untapped territory. And I tried to build up a method of determining whether it would cost more to serve such an area with conventional open wire lines or with carrier.

"Dig Out Unit Costs"

THE FIRST JOB was to dig out some unit costs, which incidentally will also be your first chore. If you can't get exact figures, come as close as you can, and, realizing that they may contain errors, use them anyway. After all you have to start somewhere in your figuring.

Let me be prompt to point out that the cost units used in this discussion

are merely for illustration. While they do approximate the costs in our company, they may be completely off base for you — you must get your own figures.

Please refer now to *Schedule One.* At the top of the schedule you will see listed "Poles with no arms," "Poles with one arm," etc., and at the right, cost per pole and cost per anchor. The first figure, $12.00, means that a pole of the size that would normally not have an arm on it, costs $12.00 to install, and the $10.00 figure under anchors means that if we installed an anchor (and guy) on that pole, the anchor would cost $10.00. The pole costs of $12.00, $16.00, $20.00, $24.00 and $28.00 are pole costs alone — they do *not* include the arms or the anchors and guys.

After deriving similar unit costs for your company, you then go on to determine the next four items of information.

We figure the number of poles per mile of average construction at 15, which is an average span of 352 feet. Your average may be more or less, depending on which section of the country you live in, what strength wire you like to use, etc.

Next, the number of anchors-and-guys per mile. We average about one anchor on every fifth pole. Again, your figure may be either more or less.

Next, the cost per circuit mile of open wire, and the figure I have used is for #12, HTL-85 steel.

Last, the cost per crossarm, complete and installed.

SCHEDULE 1
Building up Construction Cost Factors*

	Cost Per Pole Installed	Cost Per Anchor
Poles with no arms	$12.00	$10.00
Poles with 1 10 pin cross arm	16.00	11.00
Poles with 2 10 pin cross arms	20.00	12.00
Poles with 3 10 pin cross arms	24.00	13.00
Poles with 4 10 pin cross arms	28.00	14.00
Number of poles per mile average construction	15	
Number of anchors per mile average construction	3	
Cost per mile of one circuit (two wires) iron wire installed		$100.00
Cost per 10 pin cross arms installed		6.00

	No Arms	1 Arm	2 Arms	3 Arms	4 Arms
Pole cost per mile	180	240	300	360	420
Anchor cost per mile	30	33	36	39	42
Arm cost per mile	0	90	180	270	360
Cost of total pole route per mile	210	363	516	669	822
Cost with indicated number of circuits of open wire added					
1	310*	463			
2	410	563*			
3		663			
4		763			
5		863			
6		963	1116*		
7			1216		
8			1316		
9			1416		
10			1516		
11			1616	1769*	
12				1869	
13				1969	
14				2069	
15				2169	
16				2269	2422*
17					2522
18					2622
19					2722
20					2822

*Costs used in the examples in this article on the theory that 1 circuit can be installed on brackets but that if more than 1 circuit, then all circuits should be on arms.

"Per-Mile Cost Figures"

NOW COMES THE job of taking the information we have derived and developing per-mile cost figures for open wire routes. Let's take first the information in the first column, "no arms." The pole cost per mile is 15 times $12.00 or $180. The anchor cost is three times $10.00 or $30. The arm cost, of course, is zero. The total cost of the pole route, without wire, is $210 per mile. If one circuit of wire is added, the cost is $310 per mile, or $210 plus $100. If two circuits of wire are added, the cost is $410, or $210 plus two times $100.

Now the next column. The pole cost is 15 times $16.00 or $240. The anchor cost is three times $11.00 or $33. The arm cost is 15 (one per pole) times $6.00 or $90. And the total without wire is $363 per mile. Adding from one to six circuits gives total costs of from $463 to $963 respectively. The last three columns are extended out in the same manner.

What we have built up now is a per-mile cost on an average route with from one to 20 circuits of open wire. Thus it can be determined at a glance that one mile of a one-circuit route would cost $310, a five-circuit route $863, an 11-circut route $1769, etc.

Now we are ready to take some specific cases and see what we can prove about using carrier. *Chart Number One* illustrates the first case. This case is a road with no branches 12 miles long with applicants scattered evenly along the route, five each mile. The parallel horizontal lines represent necessary open wire circuits. A "C" superimposed on these lines indicates the placement of equipment to convert one channel from carrier to physical. (Note, it is assumed throughout this discussion, that one pair of wires can be utilized at a given point as both a carrier and a physical circuit.)

The first example on *Chart One* assumes all physical wire construction with no carrier. Thus six circuits are necessary to provide 10-party selective ringing to each of the 60 customers. The last two miles of the route require only one circuit, and cost $310 each. The next two miles back require two circuits, and cost $563 per mile. And so forth, back to either the cable terminal or the central office, where the open wire construction ends. The total cost of the line is thus figured to be $8,556.00.

In the next example on *Chart One,* it is assumed that one channel of carrier is used, the open wire is reduced accordingly, and the total line cost is $6,944.00, or a saving over the all physical cost of $1,612.00. If the use of the carrier saves you a cable pair (and it might or might not, depending on the carrier) you can add the saving of the cost of the cable pair at whatever you figure the cable pair is worth to you — in this ex-

Please Turn To Page 66

THE BOOKLET THAT HELPS SPEED CALLS

When customers place Long Distance calls by number, it saves their time, saves the operators' time, helps keep circuits clear. And people are more likely to call by number when they have a handy place to keep them. • That's why the advertisement across the page offers the convenient "Blue Book" to readers of November magazines. The more these booklets come into use, the better it will be for telephone customers and telephone companies alike.

"Here's an Attractive Booklet for Your Telephone Numbers"

We've just printed a new booklet for listing your personal telephone numbers.

You'll find you save time on Long Distance calls when you give the operator the number you want. This booklet helps you keep the numbers handy.

There's a copy for you at the nearest Bell telephone office.

BELL TELEPHONE SYSTEM

SAVE TIME... CALL BY NUMBER

Use the booklet to write down the numbers you already know. If there's a new number you don't have—or an old one you've forgotten—be sure to add it to the list when the operator gives it to you.

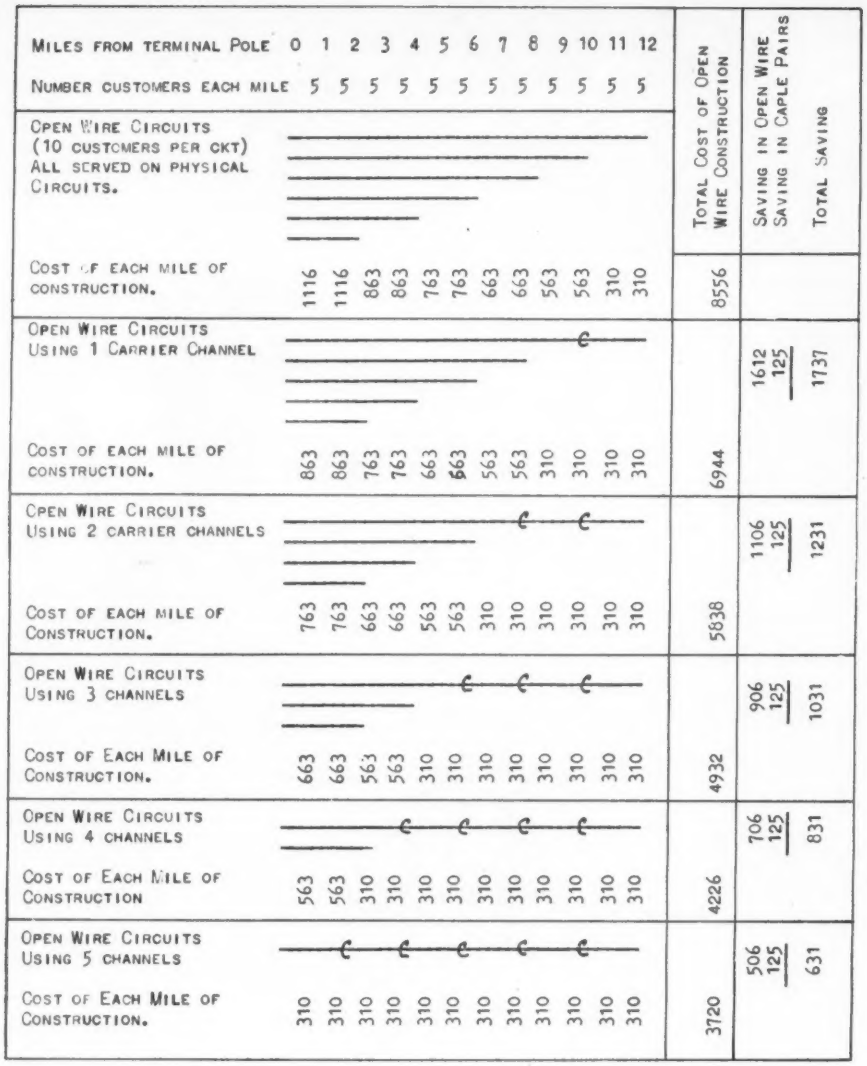
Miles from terminal pole 0 1 2 3 4 5 6 7 8 9 10 11 12
Number customers each mile 5 5 5 5 5 5 5 5 5 5 5 5 5
Total Cost of Open Wire Construction
Saving in Open Wire Saving in Caple Pairs
Total Saving
Open Wire Circuits (10 customers per ckt) All served on physical Circuits.
Cost of each mile of construction. 1116 1116 863 863 763 763 663 663 563 563 310 310
8556
Open Wire Circuits Using 1 Carrier Channel
Cost of each mile of construction. 863 863 763 763 663 663 563 563 310 310 310 310
6944
1612 125 1737
Open Wire Circuits Using 2 carrier channels
Cost of each mile of Construction. 763 763 663 663 563 563 310 310 310 310 310 310
5838
1106 125 1231
Open Wire Circuits Using 3 channels
Cost of Each Mile of Construction. 663 663 563 563 310 310 310 310 310 310 310 310
4932
906 125 1031
Open Wire Circuits Using 4 channels
Cost of Each Mile of Construction 563 563 310 310 310 310 310 310 310 310 310 310
4226
706 125 831
Open Wire Circuits Using 5 channels
Cost of Each Mile of Construction. 310 310 310 310 310 310 310 310 310 310 310 310
3720
506 125 631

CHART ONE: — Example for determining economical use of carrier.

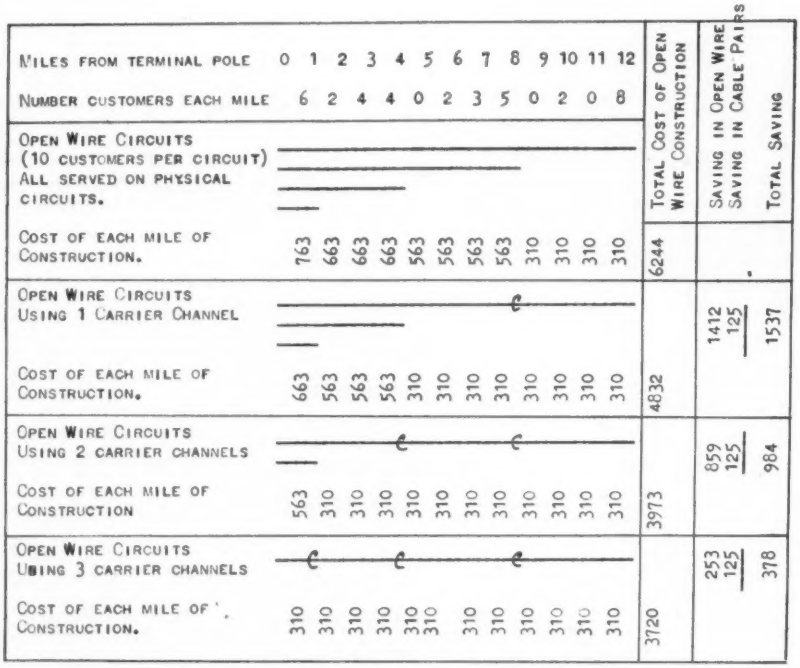
Miles from terminal pole 0 1 2 3 4 5 6 7 8 9 10 11 12
Number customers each mile 6 2 4 4 0 2 3 5 0 2 0 8
Total Cost of Open Wire Construction
Saving in Open Wire Saving in Cable Pairs
Total Saving
Open Wire Circuits (10 customers per circuit) All served on physical circuits.
Cost of each mile of Construction. 763 663 663 663 563 563 563 563 310 310 310 310
6244
Open Wire Circuits Using 1 Carrier Channel
Cost of each mile of Construction. 663 563 563 563 310 310 310 310 310 310 310 310
4832
1412 125 1537
Open Wire Circuits Using 2 carrier channels
Cost of each mile of Construction 563 310 310 310 310 310 310 310 310 310 310 310
3973
859 125 984
Open Wire Circuits Using 3 carrier channels
Cost of each mile of Construction. 310 310 310 310 310 310 310 310 310 310 310 310
3720
253 125 378

CHART TWO: — Example for determining economical use of carrier.

ample the cable pair is figured at $125 value.

In the next example on *Chart One*, two carrier channels are assumed to be used, further cutting the physical construction to $5,838, or an additional saving of $1,231 over using only one carrier channel.

And so forth on down the Chart until we have used all five channels of a five-channel carrier (some are five-channel and some are three-channel). It will be noticed that the addition of the last channel cut physical costs by only $631.

On Charts Two, Three, Four, and Five, other specific examples are laid out, all with results different from *Chart One*, indicating that each case must be specifically figured. Attention is especially directed to *Chart Three*, whereby the usual order of saving is reversed, and the addition of the 2nd channel saves more construction than the use of the first channel — and likewise with the third channel over the second.

"Determine Carrier Costs"

NOW, HAVING derived these figures, let's turn to *Schedule Two*, and see what our figures mean. The first job is to determine carrier costs. For simplicity, and because the one figure I have seen published is near that figure, I have used a flat per channel cost of $800. (If the particular carrier you have in mind has certain common equipment, the first channel may cost more than the subsequent channels in the system, and the cost figures you put down should so reflect.)

First on *Schedule Two* is a summary of *Example One*. The first column is the open wire costs of the different combinations — all physical, one carrier channel, etc. The second column is the estimated carrier cost. All physical construction requires no carrier, so the cost is zero. One carrier combination requires $800 carrier cost, two carrier channels require $1,600 carrier cost, etc.

The third column is the total of the first two. The fourth column is estimated cable saving, if this is to be considered as a factor, and since it is a saving, is subtracted from the total cost, leaving the fifth column as the net cost; sixth column, number of customers; and last column, cost per customer, maximum and minimum.

Thus, in the first example the maximum cost is obtained with the all physical construction, and the minimum cost with four carrier channels. By using four channels in this case, the cost per customer could be cut from $143 to $116. In this example, also notice that if cable savings had been disregarded, the maximum saving would have resulted from using only three channels of carrier.

Chart Five compares serving 60 customers all at the end of a 12-mile route on an all physical basis with the cost of serving these same people on a five and a 3-channel system. The costs indicate the five-channel system produces the lowest per station cost, but under altered circumstances of both number and scatter of customers, the result might not be the same. Equal costs have also been assumed for each channel on both the five- and three-channel systems, which also may not be the situation.

This article has been written, not with the idea of either proving or disproving the value of rural carriers, but to give some idea as to how a small company might go about answering the question as to whether or not it can afford to use any, based on original cost.

Nor, as has already been pointed out, is this all of the story. This carrier equipment must not only be bought but it must be installed. Pole mounting equipment, central office space, installation labor — these must be considered also. There is some indication that considerable expenditure in filters must be added to the cost of the carrier. The field terminations will have to have power, and this probably means a minimum electric bill for each channel termination at different points. Depreciation and obsolescence are unknown, with the wild guess being that depreciation will be on the low side and obsolescence on the high side. Relative maintenance costs of $1000 worth of open wire and poles against $1000 worth of carrier will probably give a nod in favor of the carrier, but not definitely, at least yet. Comparative effects of lightning damage, and cost of repairing same, are unknown.

Still more considerations arise when considering existing pole routes, rather than new ones. Can the existing route be added to to provide more circuits? But the carrier can easily be superimposed. Rebuilding

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	Open Wire Cost	Estimat. Carrier Cost	Estimat. Total Cost	Est. Cable Saving	Estimat. Net Cost	Total Number Cust.	Maximum & Minimum Cost per Customer
EXAMPLE #1							
ALL PHYSICAL	8,556	NONE	8,556	NONE	8,556	60	143
1 CARRIER CKT	6,944	800	7,744	125	7,619		
2 CARRIER CKTS	5,838	1,600	7,438	250	7,188		
3 CARRIER CKTS	4,932	2,400	7,332	375	6,957		
4 CARRIER CKTS	4,226	3,200	74.26	500	6,926	60	116
5 CARRIER CKTS	3,720	4,000	7,720	625	7,095		
EXAMPLE #2							
ALL PHYSICAL	6,244	NONE	6,244	NONE	6,244	36	173
1 CARRIER CKT	4,832	800	5,632	125	5,507		
2 CARRIER CKTS	3,973	1,600	5,573	250	5,323	36	148
3 CARRIER CKTS	3,720	2,400	6,120	375	5,745		
EXAMPLE#3							
ALL PHYSICAL	5,804	NONE	5,804	NONE	5,804	40	145
1 CARRIER CKT	5,004	800	5,804	125	5,679		
2 CARRIER CKTS	3,745	1,600	5,345	250	5,095		
3 CARRIER CKTS	2,480	2,400	4,880	375	4,505	40	113
EXAMPLE #4							
ALL PHYSICAL	19,584	NONE	19,584	NONE	19,584	100	196
3 CARRIER CKTS	12,848	2,400	15,248	375	14,873		
5 CARRIER CKTS	10,436	4,000	14,436	625	13,811		
6 CARRIER CKTS	9,336	4,800	14,136	750	13,386	100	134
7 CARRIER CKTS	9,136	5,600	14,736	875	13,861		
EXAMPLE #5							
ALL PHYSICAL	13,392	NONE	13,392	NONE	13,392	60	223
5 CARRIER CKTS							
5-STACKABLE	4,526	4,000	8,526	625	7,901	60	132
3-STACKABLE	7,309	4,000	11,309	625	10,684	60	178

SCHEDULE TWO: — Determination of comparative per customer costs of line costs and carrier equipment

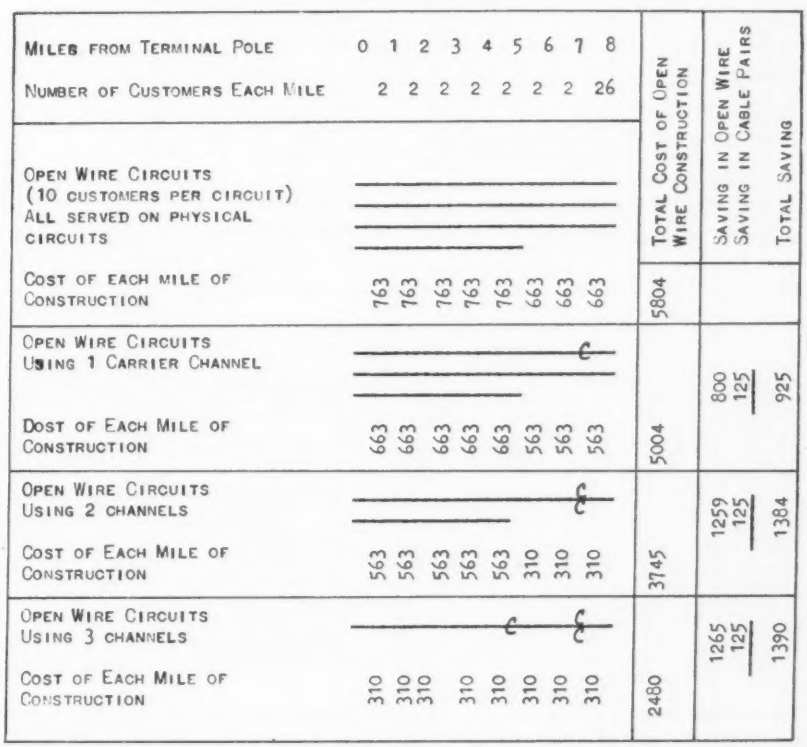
MILES FROM TERMINAL POLE 0 1 2 3 4 5 6 7 8
NUMBER OF CUSTOMERS EACH MILE 2 2 2 2 2 2 2 26
OPEN WIRE CIRCUITS (10 CUSTOMERS PER CIRCUIT) ALL SERVED ON PHYSICAL CIRCUITS
COST OF EACH MILE OF CONSTRUCTION 763 763 763 763 763 663 663 663
TOTAL COST OF OPEN WIRE CONSTRUCTION 5804
OPEN WIRE CIRCUITS USING 1 CARRIER CHANNEL
DOST OF EACH MILE OF CONSTRUCTION 663 663 663 663 663 563 563 563
5004
SAVING IN OPEN WIRE 800
SAVING IN CABLE PAIRS 125
TOTAL SAVING 925
OPEN WIRE CIRCUITS USING 2 CHANNELS
COST OF EACH MILE OF CONSTRUCTION 563 563 563 563 563 310 310 310
3145
1259
125
1384
OPEN WIRE CIRCUITS USING 3 CHANNELS
COST OF EACH MILE OF CONSTRUCTION 310 310 310 310 310 310 310 310
2480
1265
125
1390

CHART THREE: — Example for illustrating economical use of carrier.

pole lines to add more arms and circuits can be very expensive, and carrier may provide truly astounding savings. The transmission gain built into the carrier may let you engineer with iron instead of copper wire, with consequent savings, or may let you provide good service where the loss is now so high as to make the circuit practically valueless. Carrier may well provide the answer to the occasional demand for one party service far out in the country. Simply designed inexpensive carriers may make possible 5-party metallic ringing rural service instead of the usual eight or 10-party grounded ringing service, and thus perhaps increase the income from the rural phones.

At the very least, *rural carriers should command the close attention of every small company owner.* And it is not inconceivable that they will provide a big share of the answer to the rural problem. — THE END.

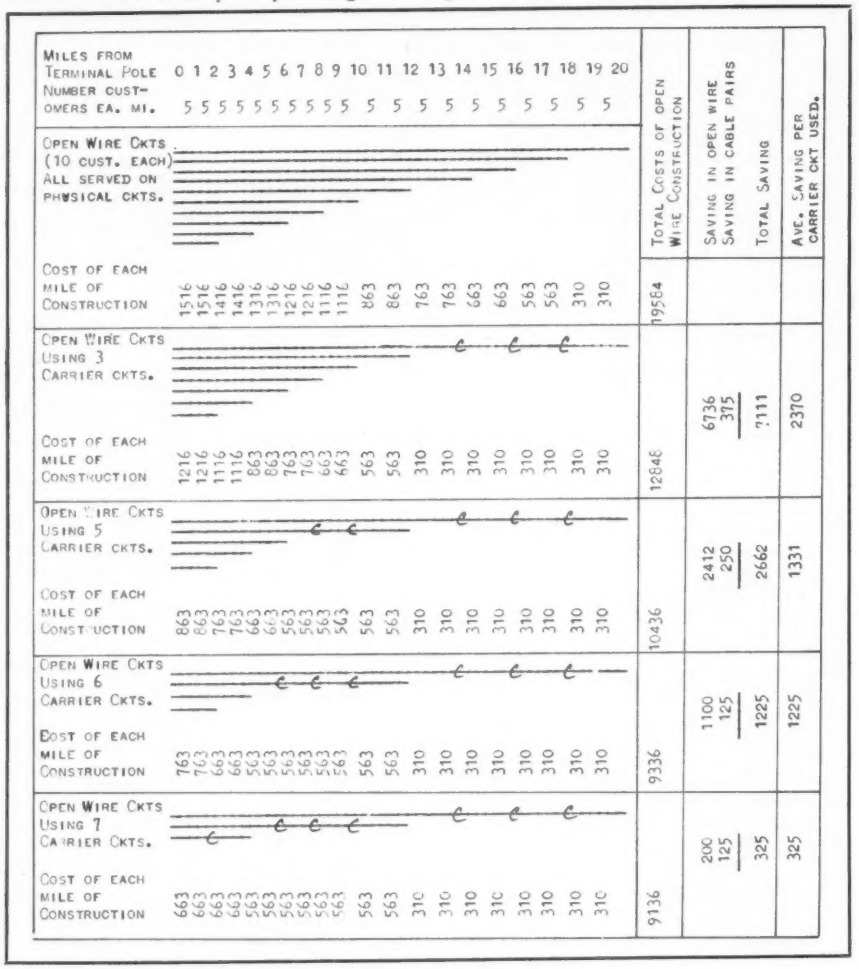

CHART FOUR: — Determining economical use of carrier.

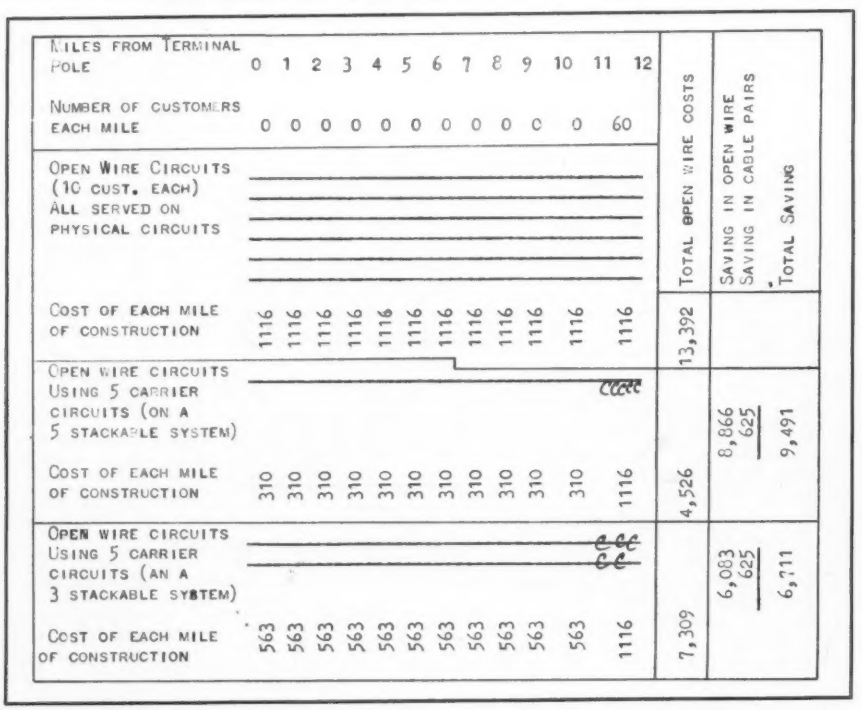
MILES FROM TERMINAL POLE 0 1 2 3 4 5 6 7 8 9 10 11 12
NUMBER OF CUSTOMERS EACH MILE 0 0 0 0 0 0 0 0 0 0 0 60
TOTAL OPEN WIRE COSTS
SAVING IN OPEN WIRE
SAVING IN CABLE PAIRS
TOTAL SAVING
OPEN WIRE CIRCUITS (10 CUST. EACH) ALL SERVED ON PHYSICAL CIRCUITS
COST OF EACH MILE OF CONSTRUCTION 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116 1116
13,392
OPEN WIRE CIRCUITS USING 5 CARRIER CIRCUITS (ON A 5 STACKABLE SYSTEM)
COST OF EACH MILE OF CONSTRUCTION 310 310 310 310 310 310 310 310 310 310 310 1116
4,526
8,866 625 9,491
OPEN WIRE CIRCUITS USING 5 CARRIER CIRCUITS (AN A 3 STACKABLE SYSTEM)
COST OF EACH MILE OF CONSTRUCTION 563 563 563 563 563 563 563 563 563 563 563 1116
7,309
6,083 625 6,711

CHART FIVE: — Example of relative savings using 3-channel and 5-channel stackable carrier systems.

Bell Homestead Named As National Historic Site

NEW HONORS have come to the little Canadian farmhouse where a young man once dreamed and worked on an invention that was to benefit the world.

The Bell Homstead at Brantford, Oregon, where Alexander Graham Bell first disclosed his conception of the principle of the telephone to his father on July 26, 1874, has been named a National Historic Site by the Canadian Government.

It is a tribute not only to the inventor, who died in 1922, but also to the telephone's role in the world of today.

Statement of the Ownership, Management and Circulation Required by the Acts of Congress of August 24, 1912, as amended by the Acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233)

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Managing Editor—John G. Reynolds, 7720 Sheridan Road, Chicago, Ill.

Business Managers, Ray W. & Roy F. Smith, 7720 Sheridan Road, Chicago, Ill.

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5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.)

Ray W. Smith, Editor

Sworn to and subscribed before me this 1st day of October, 1953.

Virginia McCollum

(My commission expires August 27, 1955)

Michigan Association Holds Annual Meeting

Eighteenth annual convention of the Michigan Independent Telephone Association sets record for total registration and small company attendance.

R. J. SCHAFER, Michigan association president, presided at the opening session of the recent Michigan convention.

APPROXIMATELY 236 members of the Michigan Independent Telephone Association (MITA) moved into Grand Rapids' Pantlind Hotel in early September. There for two days — September 3 and 4 — the Independent group participated in the Michigan association's 18th annual meeting; a meeting that established records for total registration and the number of small company representatives in attendance.

The Michigan group reelected R. J. Schafer, Pinconning, president; Vice-President J. R. Fox, Waldron, and Secretary Fred B. Twigg were also reelected. Austin Saunders was elected to succeed J. F. Van deVusse as treasurer and P. E. Taylor was elected vice-president.

The Directors are: R. E. Putnam, Muskegon; Lovell L. Cook, Bloomingdale; John Collver, Climax, John Fox, Waldron; Austin Saunders, Owosso; C. Reginald Smith, Port Hope; R. J. Schaefer, Pinconning; K. B. Sage, Central Lakes, John Sattler, Cedar; L. W. Reynolds, Ontonagon; P. E. Taylor, Pickford; and Don Carlson, Morenci.

MITA President R. J. Schafer, Pinconning, Mich., presided at the opening session on Sept. 3. In his report to the convention he said, "fundamentals are like the three 'R' fundamentals of schooling. Reading, writing, arthmetic.

"In our business," he said, "I think of those three 'Rs' as: (1) Responsibility; (2) Records; and (3) Rates."

Mr. Schafer stated that the first 'R' — *Responsibility* — is that characteristic without which no one can do a job.

"It is," he said, "a sense inculcated by the family like keeping the 'woodbox' filled. A matter of teaching—by the family. Later one assumes the responsibility of marriage; the responsibility of children, and, the responsibility for maintaining a standard of living. The responsibilites of a job or position like a teller in a bank, and the assumption of normal responsibilities — fairly executed — by anyone net equally fair returns. We folks in the telephone business assumed many responsibilities as manifested by the Certificates of Convenience and Necessity, under which we operate."

Emphasizing that the first responsibility, under these conditions, is to the community to provide the best service, within the company's ability, to the greatest number in its territory, at the lowest possible cost, Mr. Shafer warned — "We cannot shun those responsibilities for long because of the reaction of disrespect, and loss of standing in the community."

"When that happens," he said, "the whole job is much harder. The only way to avoid such unfortunate results is to accept your responsibilities in full measure and carry them out with sincerity and interest."

Describing the second "R" as Records Mr. Shafer stated that they are just as fundamental as the first "R" and commented that it is impossible for a company to discharge its responsibilities without adequate records.

"Records, are, in the final analysis," he said, "the filing of facts . . . .

"Most people are not record minded. They figure that time doing

Michigan Convention Speakers (l. to r.): F. B. TWIGG, secretary, Michigan Independent Tel. Assoc.; T. A. SAUNDERS, president, Union Telephone Co, Owosso; F. E. NORRIS, president, General Telephone Co. of Mich.; W. M. DAY, vice-president and general manager, Michigan Bell Telephone Co.; and CLYDE S. BAILEY, executive vice president U. S. Independent Telephone Association, Washington, D.C.

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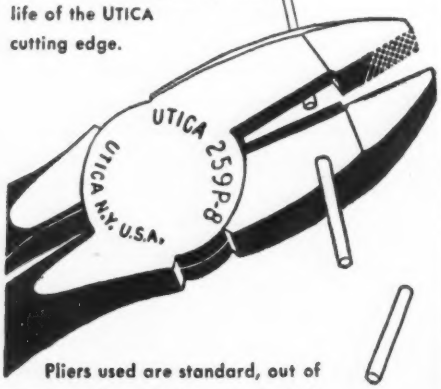

Pliers used are standard, out of UTICA stock, and the wire is .080 hardened steel plow wire (Rockwell "C" 47 Tensile Strength 224,000 P.S.I.). UTICA standards require at least 100,000 cuttings—yet this minimum is often exceeded in our continuing laboratory tests.

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a job is much more important than time to keep records. Yet, every owner or operator should know, first hand, how the company is operating. Is the company doing all right? Is the business profitable? There can be no such thing as a successful operation without records which reflect the actual conditions. There is nothing about records that cannot be understood."

Taking up the third "R" — Rates — Mr. Shafer stated that everything done or used is entitled to compensation.

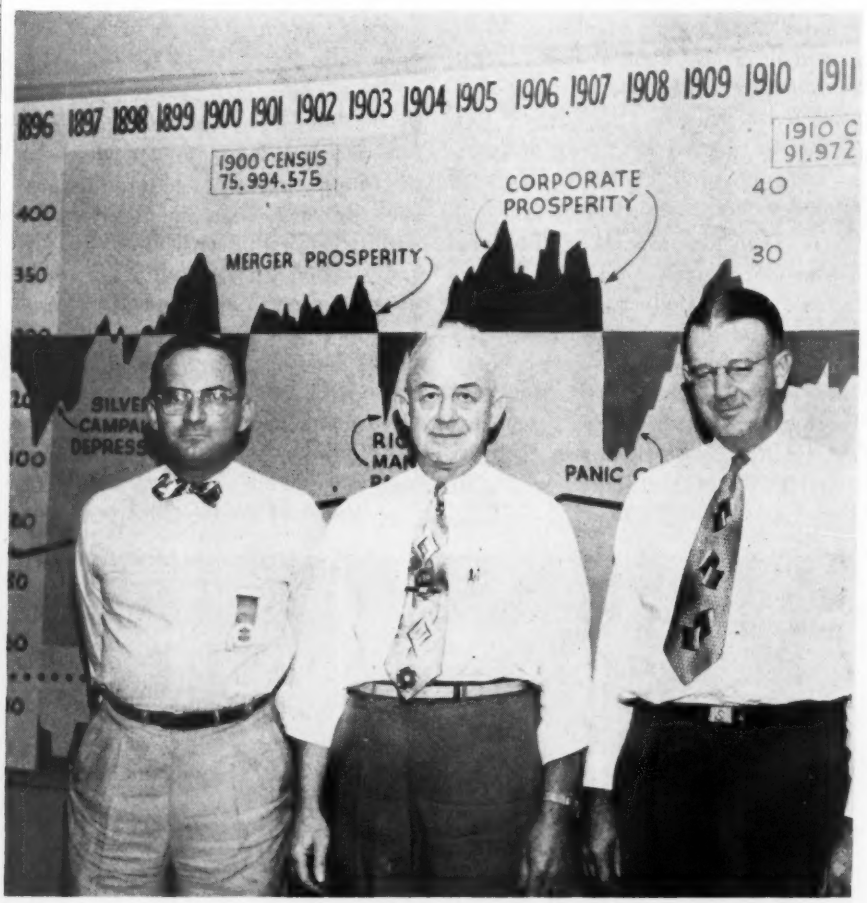
"Work done by anyone must be compensated for," he said, "and that compensation must be accounted on the books. How can you know what you need in the way of rates, if you don't know what your operations are costing, measured against your income from operations? Good records establish need for higher rates."

Secretary's Report

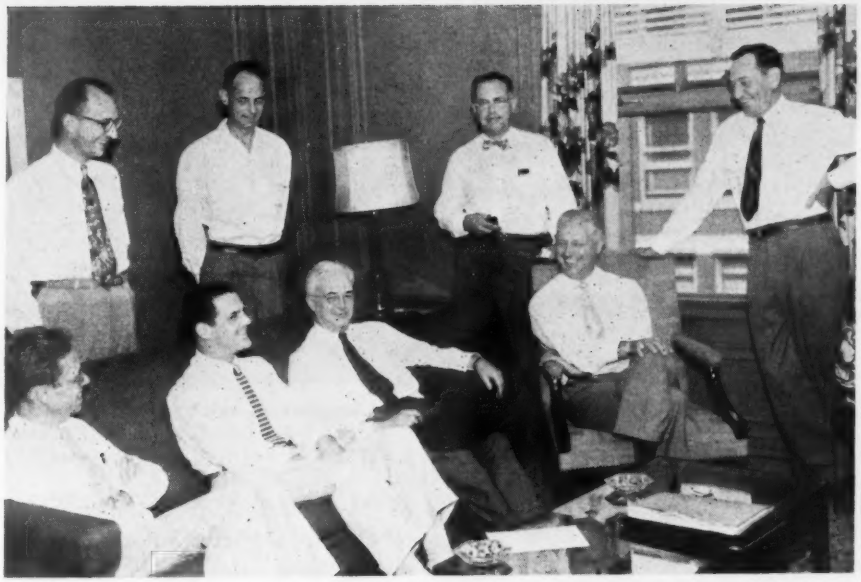
MICHIGAN ASSOCIATION Secretary Fred B. Twigg reported to the convention that in 1949, the Michigan Independents were serving, about, 180,000 telephones. As of October, 1952, the station count was 200,257, an overall station increase of 20,257. In 1949 the average value per station was estimated at about $73.64. In 1953 the average value per station is estimated at, about, $106.55, or an increase of $32.91 in station value, and the total Independent company plant, exclusive of that owned by Union Telephone Co. and General Telephone Co., of Mich., is valued at, about, $15,887,633.35.

"The farm population, as of October, 1952," he said, "was estimated at 637,900, or 9.8 per cent of the State total, but in spite of the growth of 20,257 telephones in three years in rural areas we were only serving about 31.2 per cent of the potential market. This is due to one basic reason — a lack of finances to permit expansion and conversion to dial operation. Finances are attracted by the three basic elements in any business — (1) management, (2) earnings, (3) potential development."

Discussing *Development*, Mr. Twigg reported that while only 9.8% or 637,900, of the entire Michi-



Officers of the Michigan Independent Telephone Association (l. to r.) Vice President J. R. FOX; President R. J. SCHAFER; and Treaurer, T. A. SAUNDERS



Members of this Michigan Convention group are: (Seated l. to r.) W. W. McELYEA, J. E. ELAM, FRANK DAVIES, and F. E. NORRIS; (Standing l to r.) H. H. RANDALL, T. G. SOWERS, H. F. EMERY, and I. F. KREHBIEL.

gan population live on farms, only 31.2% claim to have telephone service through facilities of one of the 137 Michigan telephone companies.

"That means there are about 437,625 farms without telephone service," he said. "Of that number, we can safely drop out, about, 25% or 110,000, for any one of several reasons, but even then, there remain about 327,625 farm homes to be served."

Pointing out that Michigan is 10th on the list of the high 15 states, furnishing telephone service to farms and, is in the high 15 states for farm cash income, Mr. Twigg emphasized that with the area for expansion, and the high farm cash income there would "certainly appear to be a rosy future for the telephone business."

"The catch," he said, "is how to get finances, to rebuild plant, expand plant, convert to dial, attract investment capital, improve service and build revenue to pay off the mortgage and dividends. If the job were, in reality, half as complicated as it sounds, we might all give up the ghost right now and look for some less painful way to bow out of this earthly life."

Stressing that proof of the fact that the two potentials, (1) area for expansion, and (2) high income, can be brought together, lies in the accomplishments of neighbors, Mr. Twigg described several companies that have already done the possible:

(1)—In District No. 1, the southwest quarter of Michigan, there have been, or are now being, negotiated in the final stages — loans amounting to more than $850,000.00, by five companies, which will provide dial service to the maximum number of users in their territories.

(2) — In District No. 2, the Southeast quarter of the state, loans amounting to $1,880,000.00 are in negotiation for seven companies by which they, too, will provide dial service to maximum number of users.

(3) — In District No. 3, the Northern half of the Lower Peninsula, there have been, or are now being negotiated loans amounting to $1,823,000.00 to seven companies to provide new plant, and common battery or dial service to the maximum number of people.

(4) — In District No. 4, the Upper Peninsula, plant improvement and new dial services by four companies will involve over $2,000,000.00.

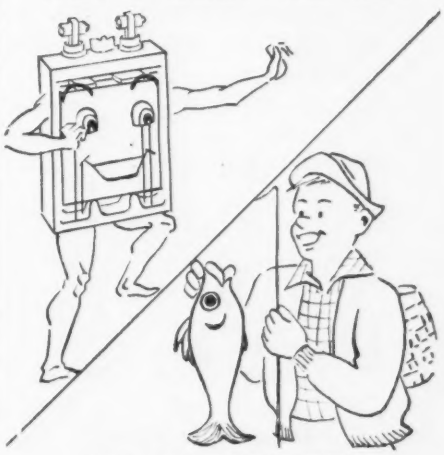
"In the sum totals," Mr. Twigg reported, "there are 23 companies now under, or will be under, loan contracts before Nov. 1, 1953 — amounting to $6,553,000.00. That means three things: (1) There will be 23 more rural communities with modern dial service 24 hours per day, seven days per week, and (2) the total value of plant used and useful to the purpose of service will be more than double the present valuation, with an estimated station increase, approximating 30.000. And — remember — we are excluding the Union and General telephone companies from these figures. And —

TAKE A LOAD OFF
YOUR BATTERIES

AND OFF YOUR MIND
INSTALL A FLOTROL

Model 75A

THEY'LL ENJOY THE REST



AND SO WILL YOU

FLOTROL has no moving parts, requires no routine maintenance or adjustment; it supplies the load current as you need it, doesn't wait for the load to pull the battery down and then recharge the battery. Result—longer battery life, less power consumption, fully charged batteries all the time, and scores of maintenance man-hours saved yearly.

Single-phase models from 1/2 ampere to 24 amperes, described in Bulletin 160.

Three-phase models from 25 amperes to 200 amperes, described in Bulletin 161.

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FLOTROL SUB-CYCLE

remember, too — that these programs will be completed by Oct. 1, 1954. And (3) that in these communities, the area of expansion and high farm income have been brought together.

"This real progress is the result of: (1) Initiative, by managements of the companies involved; (2) the sincere interest and leadership of Michigan Association President 'Russ' Schafer; (3) the Small Company committee; (4) the several consultants and lawyers who know the "angles;" (5) the cooperation of the Bell Company, the financiers and suppliers, who make the loans, and furnish equipment and services; (6) the Michigan Public Service Commission and, finally, the Association offices, where coordination takes place.

"One of the outstanding facts in this history of accomplishment is: of the 23 companies involved in the programs of re-organization, rehabilitation and preparation for change to dial service, 19 belong to this Association."

Directors of the Michigan Independent Telephone Association (l. to r.); J. R. FOX, L. W. REYNOLDS, C. R. SMITH, JOHN SATTLER, C. L. COOK, DON CARLSON, R. E. PUTNAM, JOHN COLLVER; K. B. SAGE, T. A. SAUNDERS, R. J. SCHAFER, and F. B. TWIGG, secretary.

Extended Service Problems

FRED E. NORRIS, president of the General Telephone Co. of Michigan, Muskegon, stressed that extended service is a service which should be determined on its merits and not through the use of any kind of a formula.

"This idea of extended service," he said, "originated in the metropolitan areas as a replacement for FX service. For a long time there was a feeling this is a matter for someone else — not for me. Developments in the growth of our country have occurred which have changed this. Extended service has gone out state — got away from the Metropolitan area—not to the exclusion of the Metropolitan area, to be sure, but is finding its important place in many instances in out state areas.

"One of the reasons for that is the shift in the population to the suburbs and smaller communities. Shift of population of people who have continued interest in the larger communities. Industry is locating with greater rapidity and more frequency in the smaller communities — brought on partly by such things as improved roads and improved automobiles, tendency toward group riders and improved public transportation.

"Those things are causing people with interest in one locality to move to another, only to find in this other locality the communities are not self-sustaining with respect to such things as amusement facilities, shopping facilities, medical service, as well as employment. They move out and into these areas and find these situations. They find as a result that everytime they wish to place a telephone call means long distance charge. There is a natural resistance to a long distance charge to a nearby point of contiguous exchange when it is necessary to use those facilities in accordance with what you might say, the day by day method or mode of living. They ask for something else. They want extended service when that situation develops."

Clarifying the definition of extended service, Mr. Norris said, "extended service is non-toll interexchange service.

"The error that is frequently made in connection with this definition," he said, "is that any time you have non-toll interexchange service by this definition, you have extended service. I don't think that is correct at all. I think extended service is different than non-toll interexchange service or so-called free service because I believe that extended service occurs only when you have a large and substantial community of interest between the communities involved.

"The mere elimination of the toll charge as had been the desire on the part of the REA co-ops is not in our view. The plan that constitutes extended service must be that real and substantial community of interest spread over a substantial percentage of the customers. It is important to bear in mind that it must be spread over a substantial percentage of the customers and use that as the yard stick instead of the amount of noise that is being made."

Mr. Norris suggested that the company involved in requests for extended service should find out whether there is a real and genuine need for it. He said the company should take the toll tickets between its exchange and the points to which extended service is being discussed and find out who is making these calls — how many they are making and what kind of customers are making them.

"That is not complicated," he said. "Certainly you have to know what your problem is to define it. So you have to make a ticket and user study for that. How many customers make zero calls between these two points; how many customers make one to five; how many six to 10; how many 11 to 15? Then you can clock it any way you want. But the idea is to find out how many customers are going to benefit by this extended service. The reason for that is a good one, for frequently (and more frequently than not) extended service costs you something to render. If it costs you something to render, it means you are going to have to go to your customers to get that something and you want to be sure that you are not making someone pay for it who has no use for it."

Mr. Norris pointed out that extended service usually means such things as these: (1) You eliminate the toll revenues and if you don't have the toll revenues because you don't own the toll lines, you elimin-

ate your A and B compensation; (2) you also eliminate toll operating costs and the need of carrying, maintaining, etc., of toll facilities, toll lines, toll switchboard positions, etc.; (3) you eliminate billing and collecting expenses, and (4) you frequently can get higher rates when you give extended service because of the principle which is generally accepted that rates follow the size of the exchange and when you combine two or more exchanges into a local calling area you have a larger base for rate determination.

"Extended service," he said, "also means that you are going to have to provide more central office equipment for this extended service than you would for toll service for the simple reason that people are going to use the service much more."

Explaining that with extended service a company gains exchange revenues, loses facility compensation, it may be losing toll compensation, and it gains on the elimination of toll facilities, Mr. Norris emphasized that on the minus side the company has greater investment involved in interexchange facilities and central office equipment.

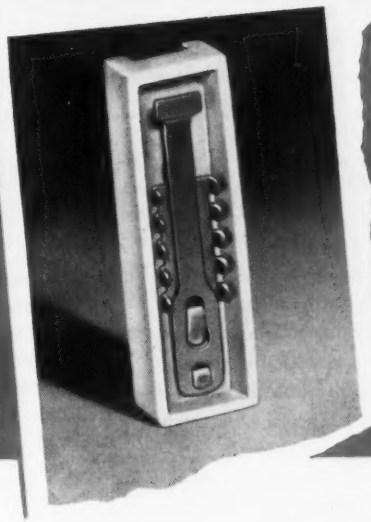
"So take these gains and losses and set them up in two columns — a plus and a minus column," he said, "and if your plus column exceeds your minus it is good business in doing that. If it doesn't then you have a measure of how much additional revenue you need to break even at the same point that you were before you went into it."

EDITORS NOTE: Abstracts of addresses presented by *Wm. M. Day*, vice president of Michigan Bell Telephone Co.; *Owen J. Cleary*, secretary of the State of Michigan; *T. A. Saunders*, president of Union Telephone Co., Owosso; Commissioner *Hunt* of the Michigan Public Service Commission; and *George W. Loomis*, will appear in a future issue.

Harrisonburg (Va.) Co. Rate Increase Approved

THE VIRGINIA Corporation Commission last month approved the application of the Harrisonburg (Va.) Telephone Co., Class A Independent, for rate increases totaling $93,000 a year, immediately following a hearing on the request.

AUTOMATIC'S PROTECTED CABLE TERMINALS NOW USE "DOLLAR-SAVER" DISCHARGE BLOCKS

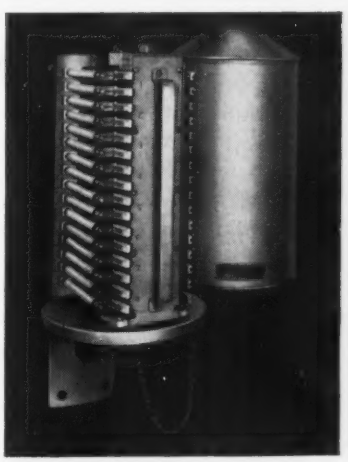


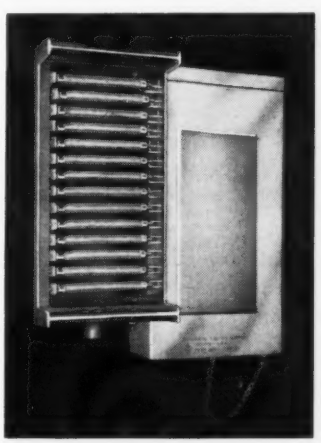
Automatic's new Type 70 "Dollar-Saver" discharge block lasts for an exceptionally long time because its bi-metallic element is self-grounding and does not gradually burn away with each discharge. It needs no attention as it is self-resetting. It remained undamaged through an 11,000-volt test which destroyed blocks having metal sawteeth alone!

Type 35 Protected Cable Terminal

Lasting, sturdy construction. Each pair has two 3-amp. fuses, two "Dollar-Saver" discharge blocks with .0055" gaps.

Cat. No	Pairs	6', 24-ga. stub	Ship. Wt.
SA-38	11	no	21 lbs.
SA-39	11	yes	24 lbs.
SA-40	16	no	25 lbs.
SA-41	16	yes	28 lbs.
SA-42	26	no	32 lbs.
SA-43	26	yes	36 lbs.





Type 40 Protected Cable Terminal

Mounts easily on pole, or on building, where it eliminates drops. Reversible cover permits leading cable in from top or bottom. Seven pairs each consist of two 3-amp. fuses and two "Dollar-Saver" discharge blocks with .0055" gaps.

Cat. No.	6', 24-ga. stub.	Size	Shipping Wt.
SA-34	no	7¼x4¾x14"	20 lbs.
SA-35	yes	7¼x4¾x23½"	24 lbs.

For helpful data on our full line of protective equipment, send for new Catalog 4068-B!

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TELEPHONE ENGINEER & MANAGEMENT'S

HANDBOOK DATA SHEETS

Prepared By

JOHN S. REED

Self Supporting Ankoseal Telephone Cable Type 775-P-SS

Because of its light weight, the Ankoseal Telephone Cable Type 775-P-SS can be used as a self-supporting cable, omitting the conventional messenger strand with resulting savings in construction costs. The cable is composed of No. 19 A.W.G. medium hard-drawn copper conductors insulated with polyethylene and jacketed with plasticized polyvinyl chloride extruded directly over the core wrapped with .004-3S aluminum tape. The cable is available in the following sizes: 6 pr., 11 pr., 16 pr., and 26 pr.

The Type 775-P-SS cable differs from the regular 775-P (lead replacement) and 775-AP (direct burial) cables in that the latter have soft copper conductors. The sheath wall of the 775-P-SS cable is a black colored polyvinyl chloride compound.

As a result of extensive research and study, the Ansonia Wire and Cable Company have developd sag and tension tables for installing the 775-P-SS cables using Channell cable supports specifically engineered for the sizes of the cable made.

The data in the tables are copyrighted by the Ansonia Wire & Cable Company and are incorporated in the Hand Book Data Sheets through the courtesy of this company. *

Selection of Span Length

The maximum span length for each size of Type 775 P-SS cable in new construction is determined by the allowable sag which will provide the required minimum vertical clearance at 60°F. with no ice or wind load on the cable. An example of the minimum spans that can be employed for the 6, 11, 16, and 26 pair No. 19 A.W.G. cables in Heavy, Medium and Light Loading Districts using a 25 foot or 30 foot pole is shown in Table 1 for one set of conditions. It is obvious from this data that for a small investment in a higher pole a considerable increase in span lengths can be obtained. The span length can also be increased in cases where the minimum ground clearance can be reduced and greater sags employed. All of these points should be analyzed to realize the greatest economy in this type of construction.

Table I (Ansonia Data Sheet SS-1)

Span Lengths With 6, 11, 16, and 26 Pair No. 19 A.W.G. Ankoseal Self-Supporting Cables Type 775-P-SS With 25 Foot and 30 Foot Poles Under One Set of Conditions.

Length of Pole Feet	Depth of Setting In Average Firm Ground — Feet	Allowable Sag In Cable 60°F, No Load — Feet *
25	5	4.33
30	5-½	8.83

*Based on location of cable support 20" from top of pole and a ground clearance of 14 feet, at 60°F. with no ice or wind load.

No. 19 A.W.G. Cable	Pole Length Feet	Maximum Span in Feet: Heavy Loading District	Medium Loading District	Light Loading District
6 Pair	25	125	175	210
	30	—	—	—
11 Pair	25	175	240	245
	30	230	310	350
16 Pair	25	205	250	250
	30	265	355	360
26 Pair	25	255	265	265
	30	330	380	380

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Tables II, III, IV, and V (from Ankoseal Data Sheets SS-602, SS-1102, SS-1602, and SS-2602) present the basic design data on sag and tension calculations. The charts in Figures 1 to 4 provide the necessary information for determining span lengths under various conditions of loading. They also show the minimum sags for given span lengths for determining the minimum vertical clearance on existing pole lines. If these charts show that these clearances cannot be obtained, a comparison should be made of the cost of either setting an additional pole for the self-supporting cable on placing the cable or messenger strand in the existing spans.

*The data presented herewith applies to Ankoseal Telephone Cable Type 775-P-SS exclusively and is the result of careful research and engineering and is believed to be satisfactory for the service intended in each case. However, since the installation and service conditions are beyond the control of The Ansonia Wire & Cable Company, no warranty, guarantee or patent indemnity expressed or implied, is to be construed as a part of this data and the prospective user acknowledges this in accepting this information.

TELEPHONE ENGINEER & MANAGEMENT'S

HANDBOOK DATA SHEETS

Prepared By
JOHN S. REED

Self Supporting Ankoseal Telephone Cable Type 775-P-SS

Table II—Sag and Tension Data—No Load and Full Load Characteristics Self Supporting Ankoseal Telephone Cable—6 Pair, No. 19 AWG Type 775-P-SS (Based on Ansonia Data Sheet SS-601)

	Heavy Loading District				Medium Loading District				Light Loading District			
	No Ice or Wind 60°F		½" Ice—4# Wind 0°F		No Ice or Wind 60°F		¼" Ice—4# Wind 15°F		No Ice or Wind 60°F		No Ice—9# Wind 30°F	
Span Length in Feet	Sag in Feet	Tension in Pounds	Sag in Feet	Tension in Pounds	Sag in Feet	Tension in Pounds	Sag in Feet	Tension in Pounds	Sag in Feet	Tension in Pounds	Sag in Feet	Tension in Pounds
50	0.24	163	0.87	422	0.24	163	0.66	326	0.24	163	0.50	259
75	0.88	100	1.83	455	0.54	163	1.29	377	0.54	163	1.01	285
100	2.33	68	3.26	455	0.96	163	2.07	417	0.96	163	1.65	312
125	4.23	58	5.13	455	1.51	163	2.94	459	1.51	163	2.39	336
150*	6.48	55	7.43	455	2.80	126	4.28	455	2.17	163	3.25	350
175					4.37	111	5.87	455	2.95	163	4.22	375
200					6.21	102	7.68	455	3.86	163	5.29	391
225					8.23	97	9.73	455	4.88	163	6.45	406
250**					10.6	94	12.1	455	6.04	163	7.75	417

* Maximum for Heavy Loading District.
** Maximum for Medium and Light Loading Districts.

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Table III—Sag and Tension Data—No Load and Full Load Characteristics Self Supporting Ankoseal Telephone Cable—11 Pair, No. 19 AWG Type 775-P-SS (Based on Ansonia Data Sheet SS-1101)

	Heavy Loading District				Medium Loading District				Light Loading District			
	No Ice or Wind 60°F		½" Ice—4# Wind 0°F		No Ice or Wind 60°F		¼" Ice—4# Wind 15°F		No Ice or Wind 60°F		No Ice—9# Wind 30°F	
Span Length in Feet	Sag in Feet	Tension in Pounds	Sag in Feet	Tension in Pounds	Sag in Feet	Tension in Pounds	Sag in Feet	Tension in Pounds	Sag in Feet	Tension in Pounds	Sag in Feet	Tension in Pounds
100	.72	297	1.93	818	.72	297	1.52	626	.72	297	1.22	494
125	1.50	222	2.98	832	1.12	297	2.21	671	1.12	297	1.79	527
150	2.80	171	4.28	832	1.61	297	2.97	718	1.61	297	2.46	552
175	4.38	149	5.87	832	2.19	297	3.83	758	2.19	297	3.20	578
200	6.22	138	7.68	832	2.87	297	4.77	798	2.87	297	4.05	597
225	8.28	131	9.73	832	3.63	297	5.78	832	3.63	297	4.97	618
250	10.7	127	12.1	832	4.93	271	7.14	832	4.48	297	5.93	638
275	13.3	123	14.7	832	6.44	251	8.67	832	5.43	297	7.03	652
300	16.2	121	17.6	832	8.12	237	10.4	832	6.46	297	8.18	667
325					9.88	230	12.1	832	7.58	297	9.43	681
350									8.79	297	10.7	695

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Washington Bureau

Concluded From Page 46

• • • • • • • • •

with an operating cost of more than $1,500,000 annually."

Senator Schoeppel, addressing the National Association of Retail Druggists, cited numerous other examples of government participation in businesses ranging from glues and pastes to printing, and from roasting coffee to tugboat operation.

As it is assumed that the annual cost of federal government telephone operations, including those of the armed services and the General Services Administration, is far above $1,500,000, it was not known to which phase of governmental telephone operation Senator Schoeppel was referring. He was not in Washington at any time immediately following his talk for amplification of his points or further discussion. —THE END.

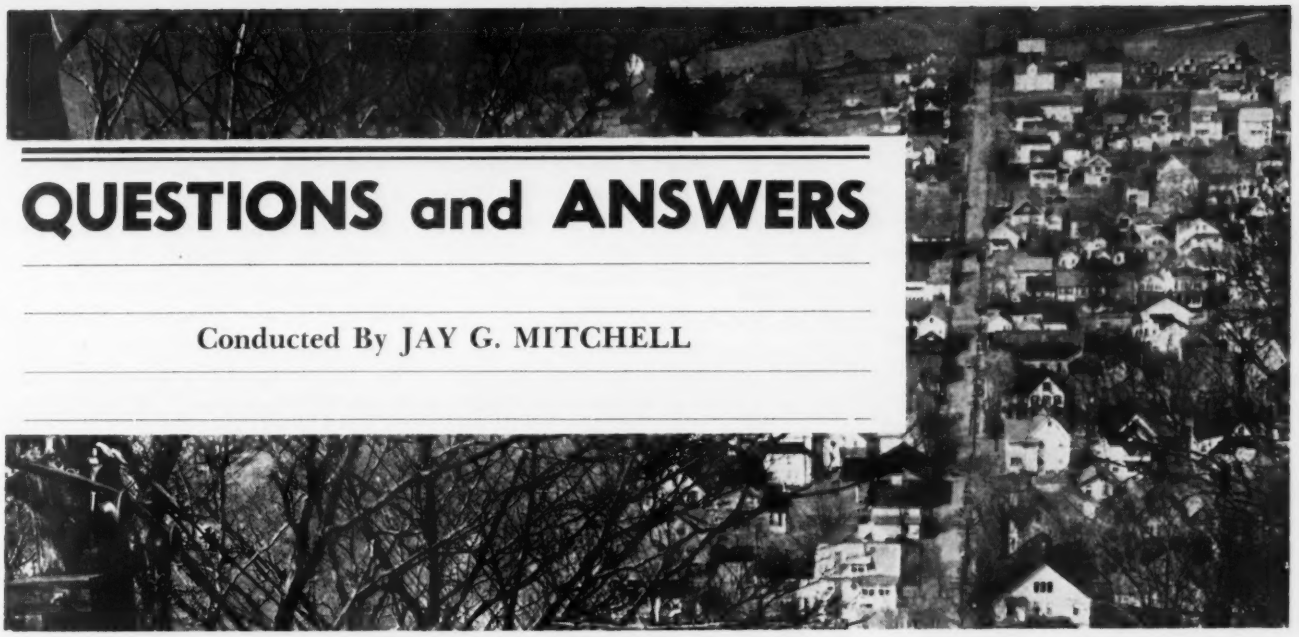
Telefon Fabrik Issues Swbd. Plug Catalog

TELEPHONE FABRIK AUTOMATIC A/s, Amaliegade 7, Copenhagen, Denmark, recently issued a new catalog describing Danish switchboard plugs which has been prepared especially for American Independent telephone companies.

The catalog presents full-size photos of the types of cords manufactured by Telefon Fabrik Automatic A/S that fit the most commonly used American switchboards. The plugs are shown in cross section, and dimensions are stated for each type.

The Transart insert in front of the catalog pictorially illustrates the precision and care with which Telefon Fabrik plugs are manufactured. Danish switchboard plugs are made with plastic insulation moulded in between the conductors which gives a solid plug and reduces the risk of shorts.

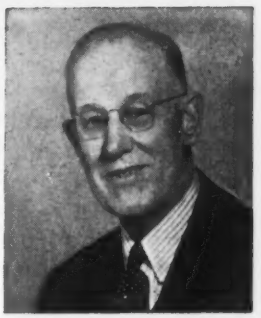
Sole USA distributors of the Danish Switchboard Cords are: Buckeye Telephone & Supply Co., Columbus, Ohio, and Suttle Equipment Co., Lawrenceville, Ill.



QUESTIONS and ANSWERS

Conducted By JAY G. MITCHELL

In this issue Mr. Mitchell sets out the solution of two characteristic problems involving the Decibel Multitester . One problem is an inquiry and the second is an illustration of a reasonable condition of another sort.



QUESTION: — *We have been following the series on The Decibel Calibration of the multitester with a lot of interest and, we think, decided profit. Will you please comment on the following set of conditions which represent one of our first attempts to make practical use of an instrument of this type.*

Through the cooperation of the engineer of the larger telephone company which connects with our system by a copper toll circuit about twelve and one half miles long, which has not been giving satisfactory service, we have collected the following data.

Output into the defective toll circuit from a testing set at the distant office, adjusted to operate with our instrument, is found to be about 16.5 *decibels with a terminating impedance at our office of a measured* 500 *ohms. With these conditions my decibel calibration reads* 8.5 *decibels output from the toll circuit at our office, obviously a loss of* 8.0 *decibels. What we would like to know is the voltage of the alternating current sent out from the large connecting office. Can this be calculated?*

ANSWER: — This simple problem involves the use of Logarithms and will be solved as follows:

A *loss* of 8 Decibels indicates that the logarithm of the power ratio of the circuit in question is minus 1/10 of 8 or minus 0.8. It will be remembered that decibels corresponding to any given power ratio is 10 times the logarithm of the ratio.

Now a logarithm of 0.8 (Minus) can only be based upon a decimal power ratio that is less than 1. Any power ratio that is greater than or equal to 1 would result in a decibel value of 0 (for a power ratio of 1) or some *plus value.*

A logarithm of minus 0.8 can only be a minus 1 plus a positive 0.2 In other words the logarithm of the 8 decibel *loss* in the problem above is t.2 Since your decibel meter is calibrated for a loop impedance of 500 ohms and a zero reference level of 0.006 watts we can determine the watts at the receiving terminal of the illustrattive toll line from the power ratio corresponding to the logarithm t.2 This power ratio is 0.1585.

Now an equation can be written, since the zero reference level is 0.006 watts, using the power ratio 0.1585 as follows:

$$\frac{X}{0.006} = 0.1585 \text{ (the power ratio)}$$

Solving the equation gives:

$$X = 0.0009510 \text{ watts}$$

Having the watts another equation can be written as follows:

$$\frac{E^2}{500} = 0.0009\,510 \qquad \frac{E^2}{Z} = \text{Watts}$$

$$E^2 = 0.4755$$

$$E = 0.689 \text{ Volts}$$

Therefore, on the basis given the R. M. S. A.C. voltage at the receiving end of the toll circuit in question is 0.689 (practically 0.7 volts).

As can be seen from the curves to be published in an early issue of TELEPHONE ENGINEER 0.7 volt in a loop of 500 ohms impedance (and a zero reference level of 0.006 watts) represents exactly minus 8 decibels.

The calculation set out above answers the direct inquiry fully. However it is believed that the practical value of the decibel calibration in the multitester can be fully realized without complete familiarity with the mathematical basis of design on which it depends. For that reason every effort has been made to avoid any mention of Logarithmic use in this series of informal comments. For those who may wish to investigate the matter along mathematical lines however another simple example will be set out. In addition it will be greatly appreciated if inquiries are sent in about any of the studiedly simple statements of the matter which are not understood.

Suppose therefore that through the use of the proper design of telephone

Please Turn To Page 78

repeater in the toll line discussed above it was found that a *gain*, rather than a loss, of 8 decibels was realized. The question then would be; what is the voltage of the A.C. voice carrying current at the office of the smaller telephone company where the above inquiry originated. The solution could then be set out as follows.

A *gain* of 8 decibels indicates that the logarithm of the power ratio of the circuit including a repeater in question is plus 1/10 of 8 or plus 0.8. As before it will be remembered that the decibels corresponding to any given power ratio is 10 times the logarithm of the ratio.

Now a logarithm of 0.8 (plus) can only be based upon a power ratio that is greater than one. As before any power ratio that is greater than or equal to 1 would result in a decibel value of 0 (for a power ratio of 1) or some *plus value*. A logarithm of plus 0.8 can only be representing some quantity that it greater than 1. Now 0.8 is the logarithm of 6.31 (the power ratio). Since your decibel meter is calibrated for a loop impedance of 500 ohms and a zero reference level of 0.006 watts we can determine the watts at the receiving terminal of the toll line in question from the power ratio corresponding to the logarithm plus 0.8. This power ratio is 6.31 (the power ratio).

Now an equation can be written, since the zero reference level is 0.006 watts, as follows:

$$\frac{X}{0.006} = 6.31 \text{ (the power ratio)}$$

solving the equation gives:

$$X = 0.03786 \text{ Watts}$$

Having the watts another equation can be written as before as follows:

$$\frac{E^2}{500} = 0.03786$$

$$E^2 = 18.93$$

$$E = 4.35 \text{ Volts}$$

It is believed that the type of computation shown briefly above can be eliminated in ordinary daily use by the use of the curves which will be published in a future installment without too great a sacrifice of absolute accuracy. It is to be remembered that a number of variables enter into the characteristics of any given electrical conductor and that slightly varying results may be obtained due to such underlying variable conditions. For ordinary practical use with physical wire circuits and commercial equipment the decibel calibration of your multitesters, of whatever standard make, will be found to be most helpful and time saving.

QUESTION:—*We have been following the series of articles on the Decibel Calibration with a great deal of interest and profit. In the issue of TELEHONE ENGINEER FORTNIGHTLY for October; third column, page* 79; *line seven is found the following "is associated with minus* 17.7 *decibels." When this is compared with the table on page* 80 *for the* 600 *ohm loop compiled on a* 0.001 *watt* (1 *milli-watt*) *zero reference level, as suggested, it appears that the voltage of* 1.00 *is to be associated with plus* 2.2 *decibels. Is this an error and is the table on page* 80 *correct. In line* 22 *of the same third column on page* 79 *is there another apparent error* (0.0215 *watt*) *which should be* 0.0125 *watt.*

ANSWER: — In both cases the printed text is in error for which QUESTIONS AND ANSWERS is very sorry. Thank you for writing. Please correct your copy for future reference.—THE END.

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New R E A Policy Statement Stresses Reduction of Investment In Initial Facilities

Policy statement for REA telephone operators stresses reduction of investment in initial facilities to keep rates down; criteria outlined for dial conversion, extended area plans, area coverage

RURAL ELECTRIFICATION Administration (REA) policies aimed at reducing the initial investment in rural telephone system to the extent consistent with REA telephone objectives, thereby bringing down the rate levels which otherwise would have to be changed, have been outlined to REA personnel by the agency's top command.

Acting in the temporary absence of Administrator Ancher Nelsen, Deputy Administrator Fred H. Strong said the area coverage policy must take into account such problems as remotely-located prospective subscribers, with resultant heavy per-station investment; or thinly-settled branch lines.

"In situations such as these, it is not practicable for the investment in telephone plant to be made at the time of the initial loan. Investment in such instances should be postponed until reductions in cost through either technological developments or increases in the number of prospective subscribers, or both, permit investment to be made in such areas on a feasible basis."

The policy statement pointed out that extended area service adds materially to the initial cost of the telephone system and to annual operating costs. Therefore, several standards were laid down to be carefully evaluated before extended area service is approved — substantial community of interest between the subscribers of the exchanges involved; use only in contiguous exchange areas; and consideration only where initial period station-to-station rates on a toll basis would be 20 cents or less. It was brought out also that extended area service between a dial and a manual office is often not practicable because of the added traffic load on the manual office.

"Where there is any question regarding (these) factors, service should be established initially on a toll basis," Mr. Strong said. "The additional cost of providing extended area service at a later date would not be much more than if provided initially, and the experience of calling habits, the extent of extended area service desired, and the actual cost as would be reflected in rates to the subscribers could be determined more accurately."

Turning to retention of existing plant, the statement said the extent to which existing plant should be used or rehabilitated will depend on suitability of the present facilities, and whether they can be modified or expanded more economically than they can be replaced; and whether they can be used more economically over a five-year period.

"Generally, in small rural exchanges," Mr. Strong explained, "telephone service can be most economically provided through unattended dial offices. However, there are instances where an applicant owns relatively new manual equipment in good operating condition." This should be evaluated in considering whether manual operations are to be continued, it was said, along with such factors as expected local traffic and toll volumes, present and prospective level of operator wage rates, annual cost of new dial equipment — including debt service, replacement, maintenance, and amortization of unrecovered investment in manual equipment being replaced — and influence of dial operations on toll settlements and connecting company agreements.

"It should be noted," the statement added, "that a decision to retain manual service at an exchange, with rehabilitation and expansion of outside plant, does not preclude the possibility of future loans to convert retained manual systems to dial operation. The design of outside plant, selection of station equipment, etc., shall be based on convertibility to dial operation."

A maximum party line fill of eight subscribers was specified, except that in marginal areas where savings can

Please Turn To Page 80

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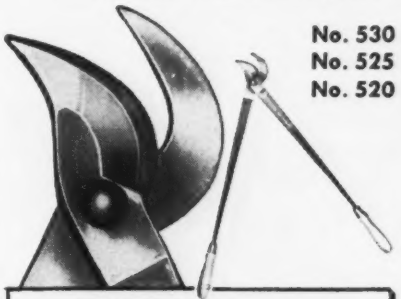

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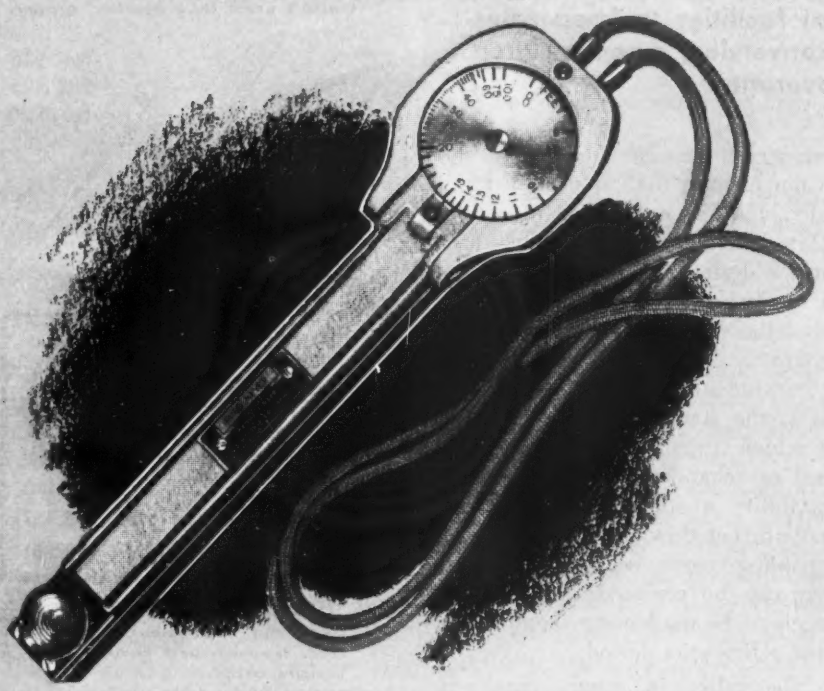

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be realized, REA will approve a maximum line fill of 10 customers.

In the exchange base rate area, graded service should be provided in accordance with subscriber wishes, the policy statement declared. Outside of the base rate, graded service should not be offered without careful balancing of rates, including mileage charges, against costs. "Consideration should be given to the possibility of receiving contributions to the construction costs for graded service required by subscribers located at considerable distances," it was added.

Another point was, "Joint use of electric system poles in many situations will afford economies in initial investment and operation, when all factors are considered. Therefore, borrowers and their engineers should make provision in system designs for the maximum economical use of joint use construction."

BOOK REVIEW

How To Get More Business By Telephone by Jack Schwartz, 256 pages, illustrated. Published by Business Bourse, 80 W. 40th St., New York, N. Y. Price $4.85

WITH 50,000,000 TELEPHONES in use in the U.S. sales transactions through the telephone have grown remarkably in recent years, as this book demonstrates. This is largely because of new standards and codes of salesmanship courtesy conduct and development of fast techniques of service.

This book gives the know-how, the standards of successful selling procedure which enables trained telephone salesmen to say, (as does author Schwartz, who has sold six millions in insurance in the past eight years, solely by telephone), "everytime I lift the receiver off the hook I earn $5.60."

The book is highly concrete and practical, giving detailed examples and methods for successful selling by phone of department store goods, groceries, insurance, real estate, electrical appliances and household goods, industrial goods, even professional services. Instructions are remarkably detailed and full and authoritative. The new methods of "sales approach" by telephone, for securing appointments to call, on both business men and housewives, are remarkable for their strict discipline and success.

York Hoover 5000 WD two-man line body fully equipped for digging and pole setting.

York Hoover's New Line Body Designed For Two-Man Operation

THE YORK-HOOVER CORP., York, Pa., recently announced its new 5000 WD, Two-Man Line Body featuring: (1) Spacious body compartment with ample room for necessary tools and materials; (2) material drawers for small parts, designed with adjustable partitions for maximum adaptability; (3) long tools are carried above side compartments on each side while the derrick leg tunnel is conveniently located so that derrick legs can be handled with a minimum of effort; (4) extension ladder brackets located on the left side and designed so that the left cab door can always be used.

Special compartments also are included for saws, water cask, cup dispenser and rubber goods. A telescoping roof, easily adjustable, protects the entire interior loading space and material rails with chains extend along each side of the interior. Safety steps with heavy duty handles are located on each side of the rear end, welded and bolted to body structure.

The body is of all steel construction including the diamondette, non-slip floor. Eye appeal is also incorporated contributing its share in making the unit a modern and up-to-the-minute line job.

In adition to a thoroughly new and modern body, Model 5000 WD equipment offers a forward operated pole digger driven through a special transmission by the truck motor. By its use a hole eight to 20 inches in diameter, eight feet deep can be dug, normally in a matter of minutes — by two men.

Further, by simply removing the digger and driving arm, permitting the derrick legs to remain in position, a pole can be set easily by the same two men.

A double drum winch, located at the front of the body is used, one drum operating the work line and the second drum operating the cable to the derrick head. Each drum can be operated independently of the other.

Should the chassis already be equipped with a front mounted winch, then a single drum winch is used in the body to operate the line to the derrick head. Specially designed shieve masts are located at the front of the body through which the cable is threaded. The body winch, when required, has an extended shaft to the right side so that a power reel can be used.

According to the York-Hoover Corp. the 5000 WD unit can: (1) Be used as a service unit only; or (2) by adding a winch, power reel and pole derrick equipment it performs the function of a line construction job; and (3) with the addition of a pole hole digger, it becomes an "all in one" complete unit for economical line construction and service work.

With the new 5000 WD Body unit is regularly furnished the following equipment: safety tread steel floor; side cabinets equipped with bins and material drawers as illustrated; thru type box; compartment for two gallon water cask and cup dispenser; tunnels for carrying derrick legs, digging bars and similar tools; key lock on each exterior cabinet door; telescoping sliding roof providing protection for body interior; material rail at each side of body interior; right front compartment equipped for use of extended winch shaft; two safety steps with heavy grab handles at rear end; skid brackets (2) on rear cross member; full width rear fenders; and plexiglass window at front of body.

Depending upon the particular job to be done, all or part of the following list of Optional Equipment

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York Hoover 5000 WD Body has been especially designed for two-man operation. As indicated by above photograph (left) ample provision is made for carrying necessary materials and small tools in side cabinets. Extension ladder brackets (right) are of sloping type permitting use of left side door at all times.

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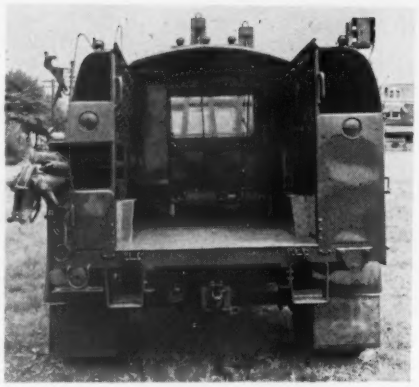

Rear view of 5000 WD Body shows location of the double drum winch and method of handling winch line.

items are required: Two gallon thermos type water cask; drinking cup dispenser; "BU" towing hook; controlator (an auxiliary hydraulic brake booster permitting positive control of truck when digging holes or setting poles); manual type electric trailer brake control; vise bracket — rear end; spare tire carrier — interior of body; "CR" power reel holder — body interior; "CR" collapsible power reel; wheel chocks with chock shoes and holder; rear fender flaps; standard type rubber goods box — in body interior; winch drum cable guards; ladder brackets, sloping type for extension ladder, left side; pike pole brackets, 4 pike poles, right side; bracket and spring to attach idle wire rope; derrick leg hold down clamp — left side rear; material chains (six in all — three on each side); mast for winch work line; mast for winch derrick line; clearance lights — 2 amber, 2 red — four in all; reflectors; directional signals; identification lights on cab roof; flares in box; steel winch cable 5/16″ or 3/8″ diameter; removable solid panel rear of winch 18″ high; and "No-Spin" differential installed.

For complete data on the 5000 WD body, write York-Hoover Corp., York, Pa.

Stromberg-Carlson Buys So. Elec. & Transmission Co.

STROMBERG-CARLSON Co. announced last month that it has acquired all assets, patents, license rights, and good will of Southern Electric & Transmission Co., Dallas, Texas.

Southern Electric & Transmission Co., formerly a partnership of L. E. Adler and his two sons, has dissolved as a partnership and become a division of Stromberg-Carlson Co. L. E. Adler, Sr., is retiring from active business.

This company manufactures wire carrier electronic equipment for the Independent telephone industry and for gas and oil pipe line systems. Stromberg-Carlson has distributed its wire carrier equipment to the Independent telephone field for a number of years, and has therefore been its biggest customer.

For the present, Southern Electric & Transmission Co. will continue to operate in Dallas, Texas, as a division of Stromberg-Carlson Co. The acquisition was effected by exchange of Stromberg-Carlson Co. stock.

KENETH R. RICKEY has been named controller of the Lenkurt Electric Co., Inc., San Carlos, Calif. Prior to joining the California firm last June, Rickey had been secretary-treasurer of Curtis Lighting, Inc. of Chicago, since 1946. He formerly was associated with the Zenith Radio Corp. and the Stewart Warner Corp. in Chicago. He is a member of the National Association of Cost Accountants and last year served as president of the association's Chicago chapter. He also is a member of the American Institute of Accountants.

Yale Law Journal Seeks Comments on REA

JOHN R. WALTZ, Note and Comment Editor of the Yale Law Journal, is gathering data for an article on the activities of the Rural Electrification Administration (REA) in the telephone field. He is interested in receiving detailed comments, favorable or unfavorable, concerning REA operations in the telephone field. Mr. Waltz's address is 401-A Yale Station, New Haven, Connecticut.

Ohio Independent Lead United States

In Independent Telephone Development

WITH 981,400 Independent stations (at the end of 1952) and 10 Independent companies grossing over $1-million annually out of $70 million in the entire U.S.A., Ohio leads the nation in Independent telephone development. There are 179 Independents in Ohio; they serve one-third of the telephones in the state, over three-quarters of the geographical area.

Behind this growth is an interesting story; a story that was aptly told by Col. Gustav Hirsch, consulting engineer, Columbus, Ohio, in an address delivered at the recent seminar of the Public Utilities Commission of Ohio.

Discussing the history of the Independent telephone industry in Ohio, Colonel Hirsch told the seminar that 60 years ago in thousands of cities, towns, and villages throughout the United States Independent telephone companies sprang up, primarily because the Bell System did not extend its service to small towns and to rural areas.

"In Ohio," he said, "almost every town or city saw the formation of Independent telephone companies. In the smaller communities the farmers and the small town people incorporated the companies, or established mutual companies, to give service to their own people making connection with each other through toll lines built by themselves and operated by themselves. In many instances they themselves furnished the poles, brackets, pins and crossarms, from their own woods, and bought iron wire from the small town store to build the telephone lines. They trimmed their own trees, shot their own trouble, and in many cases the individual subscriber bought his own telephone. This was especially true of mutual companies."

Pointing out that the Independent telephone companies working closely with the manufacturers, have pioneered in the telephone field and still continue their progressive leadership, Colonel Hirsch noted that in 1904, toll dialing was introduced by Independent telephone systems in the State of Ohio and that the first automatic telephone exchange in the State of Ohio, in 1904 and 1905, was installed at St. Marys, Ohio, and that no Bell automatic exchange was installed in the State until after 1913.

"Both toll dialing and automatic equipment," he said, "was first installed by Independent companies and many of the improvements in both telephone design and in switching equipment are directly traceable to the Independent telephone companies and their employes, and to the people who manufacture the equipment used by Independent telephone companies."

Delving deep into the history of Ohio's Independent telephone companies, Colonel Hirsch stated that following mergers and consolidations,

Please Turn To Page 84

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The Neale Model B is designed for one-man operation. It may be used with equal effectiveness for spinning new cable or maintenance spinning of existing cable. This machine is easy to transfer at pole . . . simply by removing the gate in the spinner head. Many telephone companies . . . large and small . . . have reported success in using this cable spinner to reduce outside plant costs and solve problems of new construction and maintenance.

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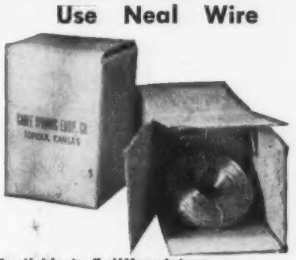

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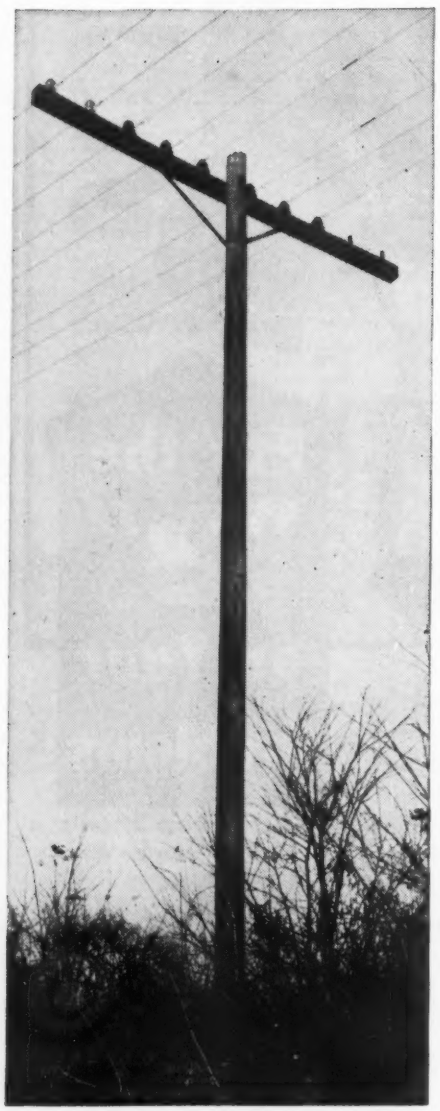

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Koppers Poles are made by an organization that has been a leader in the wood-preserving industry for more than half a century.

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Koppers Poles are long-lasting. In the first place, they are always pressure-creosoted in strict adherence to specifications. Second, there is constant laboratory control over plant production, from a Technical Department that is foremost in the industry.

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the Independent telephone companies of Ohio operated over 74% of the square area of the state, and Ohio Bell 26% of the square area of the state.

"Inasmuch as Independent telephone companies, over the State," he said, "had expanded and served into the rural area, big and little, they operated in the lean territory of the State, and the Bell in the fat territory of the State, so that, primarily, the Independent telephone companies served small towns, medium sized cities and the farm areas, as against the Bell Telephone company in the larger cities, with its small expansion in the rural areas and smaller communities."

Emphasizing that in many cases, Independent telephone companies are owned by the people in the community in which they serve, Colonel Hirsch stated that many of these companies, over a long period of time, did not pay dividends at all or small dividends to their shareholders, and inasmuch as the rates were inadequate, they were unable to borrow money for expansion, or to attract equity capital.

"The larger companies in the Independent field," he said, "are called upon to borrow money continually to serve the public, as the community expands into the suburban and rural area. The people in the suburban and rural areas demand the service as given in the city or town, even though they are not conversant with conditions and the costs attendant on operations in the suburban and rural areas at today's costs of material and labor. Telephone rates have risen much less than consumer incomes and only about a quarter as much as the cost of living."

Warning that if the Independent telephone companies are hampered in their endeavor to expand and serve everybody who desires a telephone, by their inability to borrow money, or to sell securities, Colonel Hirsch stressed that under such conditions there is only one answer to the situation, that is, either to go into the hands of a receiver who will demand the higher rates, or sell out to the larger companies and ultimately to the Bell system.

"When and as the telephone busi-

ness is monopolized," he said, "the next step will be socialization of the telephone business by the very fact that monopoly has entered and controls communication.

"The public utilities commission is charged with a tremendous responsibility in the supervision and regulation of the telephone business if we are to depend upon our system of American enterprise. Therefore, I say without hesitation, the telephone companies must be allowed adequate earnings to remain strong, must not be hampered by unjust regulations that make it impossible to extend and improve service and to keep competition alive in the ever increasingly important field of communications . . ."

El Paso Telephone Contest To Benefit Polite Patrons

A 10-WEEKS Courtesy Contest was launched last month for subscribers of the El Paso, (Ill.) Telephone Co. Prizes will be awarded weekly, with a grand prize for the family judged most polite during the 10 weeks.

The company's 12 operators will determine the winners, judging the voices, patience and politeness of subscribers in the calls they make. At the end of each week operators will turn in ballots for the best family. For purposes of the contest a "family" will include everyone in the home who uses the same telephone. The ballots will be counted by a neutral party, a different one each week. No family can win more than one weekly prize, but every family may compete for the grand prize, which will be awarded at the end of the contest period, the company said.

The weekly prize will be a ticket to the El Paso Theater for every member of the family plus a five-minute call to any person in Illinois. The call may be made at the winners' convenience.

The grand prize winner will be a guest of the telephone company at an El Paso Theater party for employes and their families during the Christmas holiday season, plus a 10-minute call to any person in the United States.

The contest is open to all persons, in town or country, whose lines clear through the El Paso office.

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INDUSTRY NEWS BRIEFS

General Tel. of Southwest Makes Organizational Change

TWO ORGANIZATIONAL changes in the staff of the General Telephone Co. of the Southwest became effective last month. R. Parker Sullivan, was named operating vice president, and Clarence A. Martin, Jr., was appointed general traffic superintendent succeeding Sullivan.

Sullivan fills the position which has been vacant since May of this year when W. G. Wright became president of the company. Martin is joining the General Telephone System after twenty-five years of telephone experience primarily with the New Jersey Bell Telephone Co. and International Telephone & Telegraph System.

Sullivan joined what is now General Telephone Co. of the Southwest in March, 1951, and has served as its general traffic superintendent since that date. He has been connected with the General Telephone System, however, throughout his telephone career which began after he was graduated from the University of Notre Dame in 1937.

He was assigned to the plant department of the Lexington Telephone Co. (now General Telephone Co. of Kentucky) at Lexington, Ky. until 1941. For the next two years, he was with the Wisconsin subsidiary as a toll line and traffic equipment engineer.

In 1944 Sullivan transferred to what then was the Indiana Associated Telephone Corp. and served there as traffic superintendent until 1945. He then returned to Kentucky to be that company's traffic superintendent and served in that capacity until his appointment as plant superintendent for the same company in 1950.

Martin has been affiliated with the International Telephone & Telegraph System since 1946, first as traffic staff representative and then in 1951 as project engineer for Federal Telephone & Radio Corp. in Clifton, N. J.

He received his degree in Electrical Engineering from Cornell University in 1928, after which he joined the New Jersey Bell Telephone Co. as a traffic engineer. He served in this capacity until 1946 except for a two-year interval during World War II when he was on a wartime "loan" assignment to the Western Electric Co.

Martin was born in 1903 at Ithaca, N. Y. His mother was Dean of Women at Cornell University prior to her retirement and his father, who is now deceased, was Dean of the College of Architecture at the same university.

Independents Report Dividend Declarations

THREE MAJOR Independent telephone concerns — United Utilities, Inc.; Associated Telephone and Telegraph Co., the subsidiary of Theodore Gary & Co., which controls the Automatic Electric manufacturing companies, foreign Gary Group operating telephone companies and Gary service affiliates; and the Central Telephone Co., recorded dividend declarations or increased net income last month.

United Utilities Board of Directors, it was announced by President Alden Hart, declared its 34th consecutive common stock quarterly dividend. The dividend of 25 cents per share on the outstanding common stock was payable on Sept. 30 to stockholders of record Sept. 10.

Associated Telephone & Telegraph ordered a dividend of $41 on the Class A stock payable Dec. 22 to stockholders of record Sept. 21. This dividend clears arrears on the Class A stock issue since a dividend of $42 was paid in July leaving arrears at $41. A regular quarterly dividend of $1 was declared payable Oct. 1, in addition to two other $1 payments this year.

For the seven months to July 31,

Please Turn To Page 88

Group photo taken during District Meeting of Missouri Telephone Association, Macon, Mo.

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THE NATIONAL TELEPHONE SUPPLY COMPANY

Officials of the Southwestern States Telephone Co., Front Row (l. to r.) C. R. Lee, traffic superintendent; Pat Weekley, assistant comptroller; A. J. Lacy, division manager, Skiatook; M. E. Barnes, division manager, Frederick; W. T. Moore, division manager, Henderson; J. M. Nelson, division manager, Welsh; T. B. Hollingsworth, division manager, Stuttgart; G. M. Brennan, division manager, Bryan. Second row (l. to. r.) C. N. Davis, supervisor of advertising and directories; H .N. Hammond, plant superintendent, Brownwood; B. F. Vann, commercial supervisor, Brownwood; R. E. Harris, division manager, Purcell; Wm. Esslinger, division manager, Irving; John Allen, division manager, Brownwood; D. T. Strickland, general manager, Brownwood; E. S. Germain, San Francisco, California; John Smith, traffic supervisor, Brownwood; C. G. MacLelland, special service supervisor, Brownwood; L. V. Ford, comptroller, Brownwood; E. H. Utzman, commercial superintendent, Brownwood.

Central Telephone Co. recorded consolidated net income of $486,000 or equivalent to $1.11 per common share. This compares with net income of $108,000, or $1 a share in the same 1952 period.

Minnesota Independent Gets Rate Boost

RATE INCREASES of about $40,000 annually, to bring the rate of return of the New Ulm (Minn.) Rural Telephone Co. up to 5.80%, have been approved by the Minnesota Railroad & Warehouse Commission. The rate increases are principally for the New Ulm exchange, where the Class C Independent is taking over a toll center which has been operated for many years by the Northwestern Bell Telephone Co.

In issuing the order, the commission pointed out that the New Ulm company is retaining the Northwestern Bell operators. As a result, it has had to institute a pension plan, and boost the wages of its employes an average of 11% to meet the same hourly wage schedule as that paid by Northwestern Bell. The rate increase request was filed to defray the additional costs.

Southwestern States Observes 25th Anniversary

The Southwestern States Telephone Co., Brownwood, Texas, celebrating the 25th anniversary of the location of its general offices in Brownwood, has grown from 24 small exchanges with 4,000 telephones to 180 exchanges with 89,000 telephones in four states.

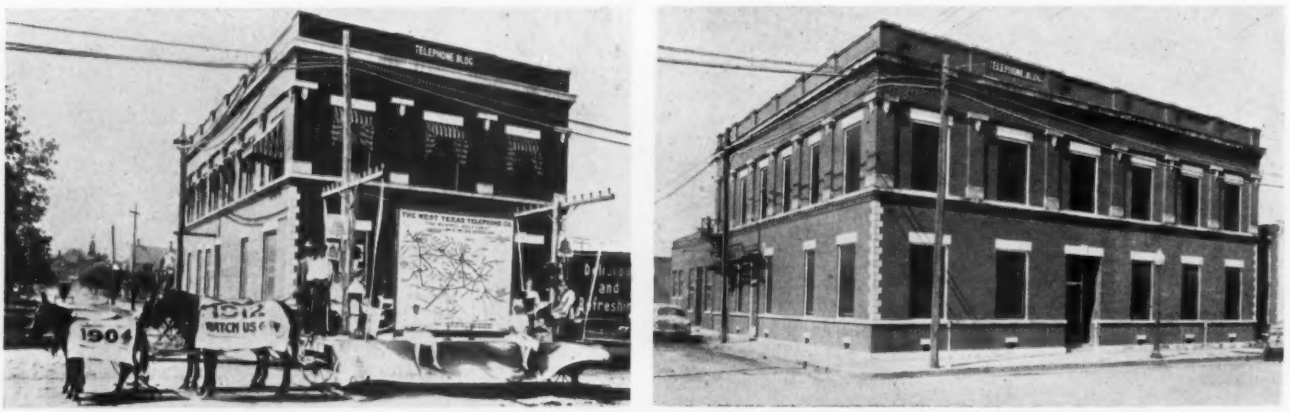
In August, 1925, the Southwest Telephone Co. which later became the Southwestern States Telephone Co., was organized at Little Rock, Ark.

From this small beginning in Arkansas, Southwestern States has become one of the largest among the nation's Independent telephone companies.

The beginning of a large expansion program late in 1927 brought the company into Texas and Oklahoma. Districts were set up in Grand Saline and Georgetown, Texas, and Purcell and Frederick, Okla.

The expansion into Texas and Oklahoma made it difficult to supervise the company's operations from Little Rock and necessitated a move of the general offices to a point nearer to the newly acquired Texas and Oklahoma properties.

On Sept. 2, 1928, the firm moved its general offices to Dallas. During the same month, the company purchased the West Texas Telephone Co. which then had its general offices in Brownwood. The general offices of



The photograph on the left shows the Brownwood, Texas, building that in 1912 housed the entire general office forces of the West Texas Telephone Co., which was purchasd by the Southwestern States Telephone Co. in 1921. Right photo shows the general office building as it is today. The general manager, commercial, plant and traffic departments are located here.

the entire Southwestern States organization were moved to Brownwood in 1934.

The company has had a phenomenal growth since its organization. The West Texas division consisted of Ballinger, Gangs, Brady, Brownwood, Coleman, Goldthwaite, Lometa, May, Menard, Mullin, Novice, Paint Rock, Richland Springs, Talpa, Winters and Zephyr when Southwestern States purchased the properties in 1928.

In all of these towns in 1928, the company served a total of 8,776 telephones. With the same towns today, the company is serving 15,071 telephones.

The Brownwood exchange in 1928 was serving approximately 3,452 telephones as compared with 5,677 telephones today.

To show further the growth and improvements made by the present company, it is noted that in 1928 there were four common battery exchanges and 12 magneto exchanges. There were no dial telephones.

Today the company is operating in the same group eight dial exchanges three common battery exchanges and five magneto exchanges. Three of the magneto exchanges are scheduled to be converted to dial the latter part of this year. The remaining group are to be converted by 1957.

Over the entire system in Texas, Arkansas, Louisiana and Oklahoma, the company has approximately 1,300 employes.

From the two-story building which housed the general office forces 10 years ago, the telephone company now has three buildings for the general office forces.

Use of Telephone Shows 50% Increase In France

THE USE OF the telephone for both domestic and international calls has increased 50 per cent in France since 1939. According to a report issued last month, six million hook-ups between the nation's 2,650,000 telephones are made every day. The French telephone service is unable to meet 60,000 long-standing requests for telephones.

Vern Campbell Retires From Lincoln T & T

THE RETIREMENT of Vern Campbell as area manager of the Lincoln Telephone & Telegraph Co. at David City, Neb., and the appointment of Harvey W. Armagost to succeed him have been announced by Max Walker, district manager.

Campbell has been manager for the company at David City since 1924 and enjoys one of the longest service records of any of the company's employes. He was first engaged in the telephone business in August, 1909, when he was employed by the York County Telephone Co. at York, Neb. In 1912 the York Company was purchased by the Lincoln Telephone & Telegraph Co. and Campbell became exchange manager at Gresham. In 1913 he moved to David City as an installer and repairman and three years later was made a lineman for the district foreman at Lincoln. This job was interrupted by World War I when Campbell enlisted in a Field Signal Battalion and served overseas until June, 1919, when he resumed his work as a sub-foreman with the telephone company at Lincoln. In 1920 he returned to David City as an installer and repairman and became commercial manager of the exchange

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News Briefs

Continued From Page 89

in 1924. In 1934 he was promoted to area manager with supervision of all exchanges in Butler County.

Armagost joined the company as a groundman in 1929 and became a lineman in 1934. In 1941 he became an installer and repairman at David City and in 1952 was advanced to the position of wire chief.

TVA Starts Microwave Radio Relay Service

THE TENNESSEE Valley Authority announced Sept. 27 that the first link of its new microwave radio relay facilities is now in service, connecting its power division headquarters in Chattanooga with Wilson Dam, Alabama.

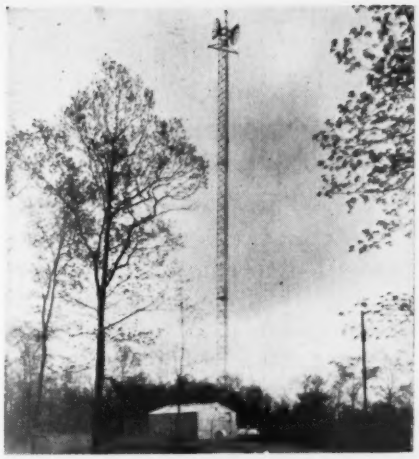
Two other links connecting Chattanooga with Nashville, and Wilson Dam with Jackson, Tenn., will go into service within the next few weeks, TVA said, augmenting the Authority's private communications system by 353 miles of microwave channels, at an estimated cost of $705,000 for the three new links.

The expansion of TVA's power system, now under way, makes it necessary that the TVA communications system parallel this growth in order to handle adequately the dispatching and maintenance of the enlarged power operation, TVA officials said. In addition to the new microwave channels, TVA is presently extending its communications web by the addition of several hundred miles of telephone lines, power line carrier, and other communications circuits.

"The major part of our communications expansion is being provided by microwave," G. E. Farmer, chief of TVA's Communications Engineering Branch, Chattanooga, said, "Microwave was selected because of the economy in construction of microwave radio relay channels and the diversity and reliability that this type of facility will add to our system, due to the alternate communications channels provided. The new channels will not replace any present facilities, but will provide main trunk channels for key terminals on the system."

Each of the three new microwave links will initially carry five telephone circuits and one teletype circuit, with an ultimate capacity of 22 telephone and 19 teletype or telemetering circuits. These additional circuits can be added, as future needs

Microwave transmitting and receiving equipment in TVA's Chattanooga office. Chattanooga is one terminal of TVA's new microwave link with Wilson Dam, Ala., which went into operation in September. Left to right: E. H. Ownbey, TVA radio engineer; C. A. Benenson, senior project engineer, Federal Telephone & Radio Corporation; G. O. Wessenauer, TVA's Manager of Power; and G. E. Farmer, chief of TVA's Communication Engineering Branch.



Typical microwave radio relay station, consisting of steel tower, and building. The radio frequency equipment and a gas driven engine generator which goes into service automatically in case of power failure is located in this building.

warrant, with a minimum of cost and interference with existing services.

The Chattanooga-Wilson Dam link has relay stations at Trenton, Sand Mountain, Monte Sano, Wininger, and Poplar Creek. The Wilson Dam-Jackson channel will have relay stations at the Alabama-Tennessee state line, Pickwick, Finger, and Norton Hill. Relay stations on the Chattanooga-Nashville link will be at Signal Mountain, Sewanee, Beech Grove, and Donelson. Relay stations are spaced at approximately 30-mile intervals.

The new circuits will tie into TVA's present communications system of more than 12,000 miles of telephone circuits and 2,000 miles of teletype circuits. The microwave channels also provide for the future expansion of facsimile and telemetering services, as well as telephone and teletype services.

Each relay station consists of a steel guyed tower, from 60 to 200 feet high, and a building which houses the radio frequency equipment and a gas-driven engine generator; the latter cuts on automatically in case of power failure due to lightning or other cause, Farmer explained. No attendant is needed, as each station is supervised by remote control, and any change in equipment, loss of power, or even unauthorized entry into the station is instantly indicated to the operator at the terminal station. This operator is also able to locate the cause of a power interruption and to take faulty equipment out of service. Each tow-

Please Turn To Page 92

No. 1 in a series of test results on LOWELL TELEPHONE WIRES: Resistance to Compression

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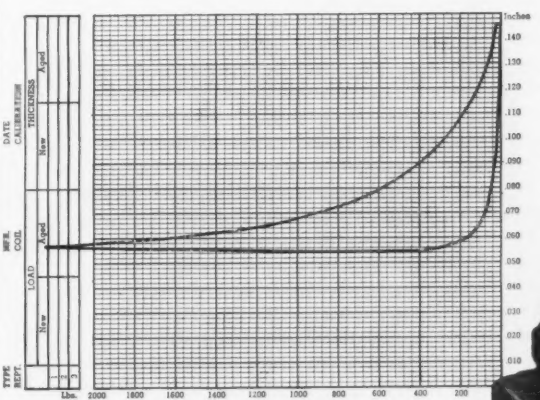
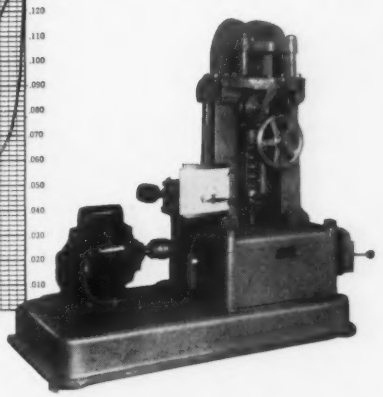


Typical test for Lowell LND18PD2 No. 18 AWG Dumbell design parallel wire, illustrated showing minimum resistance to compression of 2000 lbs.



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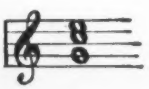

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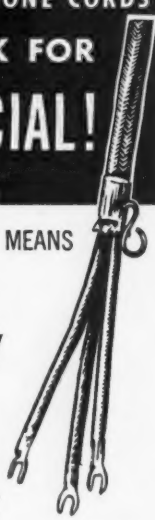

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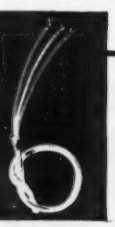

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News Briefs

Continued From Page 91

er's air hazard markings, lights, and heighth have been approved by the Civil Aeronautics Authority.

Each relay and terminal station is provided with duplicate transmitters and receivers, and these are cut into service automatically upon the failure of the normal units.

A telephone line, or a power line carrying a voice circuit, may be knocked down by lightning or a wind storm, the TVA engineer explained, but microwave facilities cannot be impaired, as far as the elements are concerned, by anything short of a hurricane.

"Our microwave radio relay towers are designed to withstand winds up to a 100-mile velocity, and winds of this velocity are only encountered in this area when tornados occur," Farmer added.

TVA's first three microwave links, of the "pulse-time modulation" type, were manufactured and installed by Federal Telephone & Radio Corp., Nutley, N. Jersey manufacturing associate of International Telephone & Telegraph Co. C. A. Benenson, senior project engineer for Federal, supervised the installation for his company, while E. H. Ownbey supervised the installation for TVA.

Additional projects to cost more than a million dollars have been approved and the equipment purchased for further expansion of TVA's microwave facilities during the next two years.

Over 1200 Attend Bradley, Ark. Cutover

CITIZENS OF Bradley, Ark. staged the biggest celebration Lafayette County has seen in years at the recent cutover of the new Bradley unattended dial telephone exchange.

Over 1,200 attended a giant barbecue at which Governor Francis Cherry was the principal speaker. He placed the first call over the new dial system to Governor Robert Kennon at Baton Rouge, with both ends of the conversation being broadcast to the crowd as the call went through.

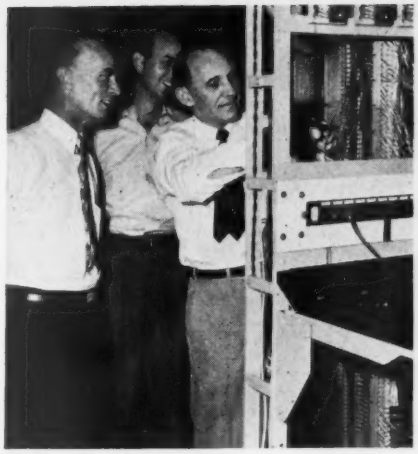
Businessmen of Bradley sponsored and promoted the celebration to express their appreciation to J. D. Garrett, Jr. for bringing them the latest in dial telephone equipment.

Up until less than three years ago the city had only 20 subscribers served by just one party line and three toll lines out of Lewisville.

Garrett purchased the exchange seven and one-half years ago. In the first part of 1951 he installed a new magneto board and began extensive construction of outside plant, giving service to 145 subscribers. The cutover brought modern dial service, complete with full selective party line ringing. The new exchange works out of the Lewisville exchange—also owned by Garrett.

Helping draw the celebration

MAKING THE FIRST CALL — GOVERNOR FRANCIS CHERRY places the first call over the new dial telephone system at Bradley, Arkansas. The governor spoke to Louisiana Governor ROBERT KENNON at Baton, Rouge, La. Both sides of the convention were broadcast at a crowd of about 1,200 attending the event.



CUTTING TO DIAL — Senator JOHN L. McCLELLAN puts heat coils in main frame to set Bradley, Arkansas' new dial telephone exchange in action. Looking on are, left, R. D. TUCKER, Crossett, president of the Arkansas Telephone Association, and HUGH WILBOURN, Sheridan, secretary of the association.

crowd of almost three times the population of Bradley, a small farming community just over the line from Louisiana in Southwestern Arkansas, was an outpouring of some of the state's leading political figures.

Governor Cherry, making his first visit to the county, led a distinguished list of guests including Senator John L. McClelland, Congressman Oren Harris, former Governor Sidney S. McMath, State Senator Jack Clark, State Representative Pat Robinson, State Senator Ellis Fagan, and members of the State Highway Commission and Public Service Commission.

R. D. Tucker, Crossett, president of the Arkansas Telephone Association, and Warren E. Bray, general manager for Southwestern Bell Telephone Co. in Arkansas, were also present for the event.

Mr. Garrett held open house at the new telephone exchange following the barbecue from 4 to 9 p.m. Two hundred and fifteen signed the guest book before a thunder storm struck at 5 p.m. The new tile block exchange is located next door to the R. L. Vaughan residence where the magneto board was set up. Mrs. Vaughan served as Bradley operator from the time magneto service was established until the dial conversion.

The new exchange, including cost of building and equipment, cost about $25,000. Already it is serving some 175 customers, including 75 rural subscribers,

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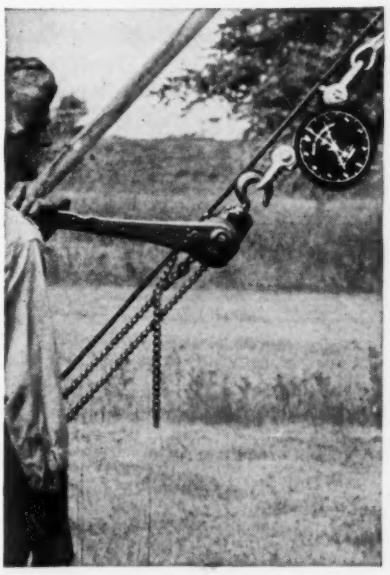

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Find out more about how Coffing Safety-Pulls provide extra protection on the job. Write for Bulletin U11SP.

Coffing Safety Pull Ratchet Lever Hoists
2 coil chain models, ¾ and 1½ tons
10 roller chain models, ¾ to 15 tons

Quik-Lift Electric Hoists
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COFFING HOIST COMPANY
ORIGINATORS OF RATCHET LEVER HOISTS
DANVILLE, ILLINOIS

Kleinschmidt Unveils High Speed Teleprinter Formerly Restricted To Armed Forces

A MAJOR INNOVATION in printed communication, previously restricted to the Armed Forces, was made available for general use last month by Kleinschmidt, Inc., Deerfield, Ill.

It is a light weight, compact teleprinter designed to send and receive messages at 100 words per minute, and actually capable of speeds up to 150 w. p. m., 2½ times faster than teleprinters presently used.

The 45-pound page printer, only about one-third the weight of those now in use and containing 30 per cent fewer moving parts, is the creation of Edward E. Kleinschmidt, one of the nation's foremost communications scientists and co-inventor of the present teletype machine.

According to the manufacturer, the teleprinter, when receiving from a previously prepared perforated tape, can hit a top speed of 15 characters a second regardless of how slowly the message originally was typed by the operator. It is claimed present printers, weighing about 110 pounds, have a top rate of 60 w. p. m., approximately the average speed of a human operator.

The 78-year-old inventor, who holds the John Price Wetherill Medal of the Franklin Institute, personally gave the machine its first public demonstration before members of the press in New York. It has been used exclusively by the Army Signal Corps and other military branches since 1949.

One of the nation's leading communcations scientists, EDWARD E. KLEINSCHMIDT, president of Kleinschmidt, Inc., is shown with his newest product, a high speed, modern-design teleprinter now available for commercial use, and one of his earliest inventions, a page printer he developed for Western Union in 1914.

Kleinschmidt said the teleprinters, now in mass production, are available immediately for sale to commercial users. He disclosed that his firm, which is continuing to fill government

Please Turn To Page 96

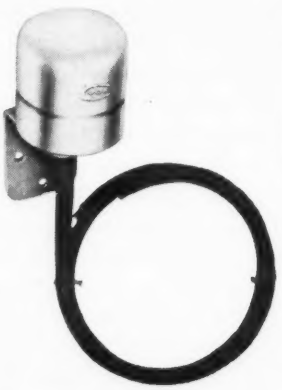
The Kleinschmidt teleprinter, Model 155, a streamlined, office-styled version of a previously restricted military unit which the manufacturer, Kleinschmidt, Inc., of Deerfield, Ill., released last month for general commercial use. Containing all features essential for most business purposes, the light weight, compact page printer is designed to send and receive messages at 100 words per minute. According to the manufacturer the unit is capable of speeds up to 150 w.p.m, 2½ times faster than teleprinters now in commercial use.

Construction M

With the Double
and America's

cook hi-cap
power cross
protector

a heavy-duty arrester for fault currents...



Unit with alloy cover removed to show porcelain base and position of carbon electrodes.

In the event of contact between power and communication circuits, the Cook HI-CAP carries the fault current long enough to allow the power breakers to operate and de-energize the power circuit.

Certified tests show that the current carrying capacity of the HI-CAP is in excess of 750 DC Amps. for three seconds; 550 DC Amps. for four seconds, and 400 DC Amps. for five seconds. These protectors can be spaced along exposed lines to provide desirable lightning protection.

The Cook HI-CAP Power Cross Protector has three carbon electrodes with fusible elements which melt and further reduce the impedence of the fault current path when the fault current continues over a long period. They are easy to mount on poles or crossarms.

Mfd. by Cook Electric Co.

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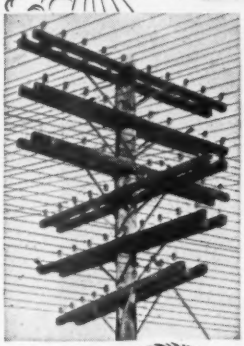
American Cross-Arm Inc.



The finest pole and wire installation is useless if cross-arms fail. "Dependable" Cross-Arms are all that the name implies—made of sturdy, American woods, long seasoned, fashioned and finished to stand every weather condition from desert heat to mountain blizzards.

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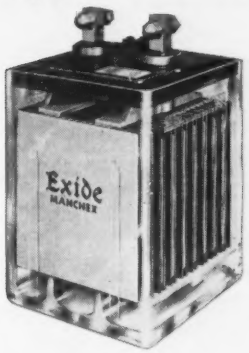
LONG LIFE—LOW COST

Exide-Manchex telephone batteries



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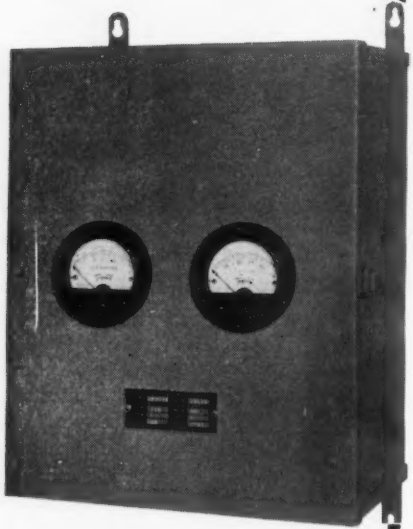
and Years-
of Service!



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The Kleinschmidt Model 120, a combination typing reperforator anl tape transmitter is intended for ultra-rapid transmission of messages. When used to transmit to a page printer, it overcomes the speed limitations of manual typing. Messages can be coded on the tape either through the unit's own keyboard or from another sending unit. According to the manufacturer the tapes then can transmit messages up to 150 words a minute, far faster than the original speed of the best human operators.

orders, is geared to turn out a teleprinter every 10 minutes. The company also will continue work on some 45 developmental projects for the government, many of them classified.

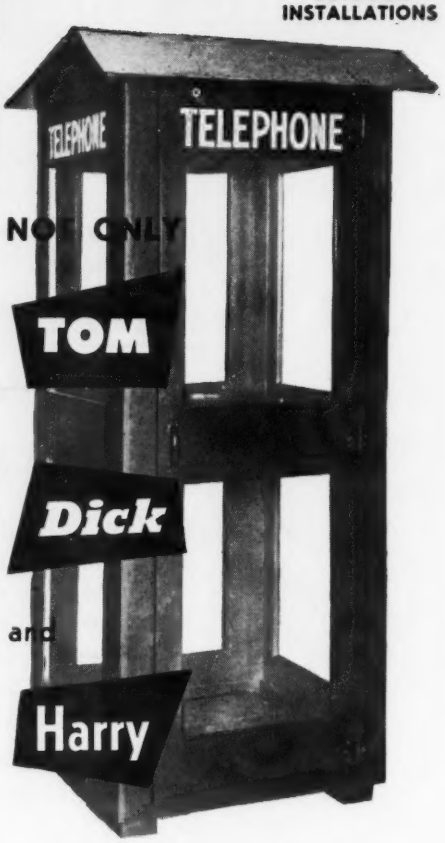
Originally only a research and developmental organization known as Kleinschmidt Laboratories, the company has grown from a $300,000 to a $10,000,000-a-year manufacturing operation since 1948. Kleinschmidt was one of the founders of Teletype Corporation which was sold in 1930 to Western Electric, manufacturing subsidiary of AT&T, for $30,000,000.

Kleinschmidt explained, that his company is entering the commercial field now, "to give impetus to the electronic age of business communication which is only now beginning to emerge.

"Within a decade," he said, "virtually every major phase of business and industrial operations will involve extensive use of teleprinters; everything from inventory and production control to remote operation of automatic business machines."

He asserted that even the major users of teleprinters today, those in the communication and transportation fields, "have come nowhere near

BEST BUY FOR OUTDOOR INSTALLATIONS



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CHURCHILL CABINET COMPANY
CHICAGO 47, ILLINOIS

realizing the full potential of the machine."

He said this is due largely to "a general public unawareness of the innumerable uses to which the machine can be put," a condition, he added, his company hopes to correct.

Planning to work with members of the Independent telephone industry who are seeking new methods of boosting revenues, Mr. Kleinschmidt forecast expansion of teleprinting service to new industries and individual firms. Potential teleprinter installations offering revenue possibilities to Independent operating companies include:

(1) MANUFACTURING PLANTS: Production chiefs can issue orders instantly and simultaneously to all departments, and can receive information on parts supplies, machine loads, quality control, and production rates. Recorded messages save costly bookkeeping work.

(2) SALES ORGANIZATIONS: Sales orders from any area in the nation can be recorded and instantly transferred to all departments concerned. Customers would get better service with time-consuming operations eliminated.

(3) AIRLINES: Using radio circuit controls, teleprinters can relay constant, errorless information and weather reports to globe-circling airships in midflight.

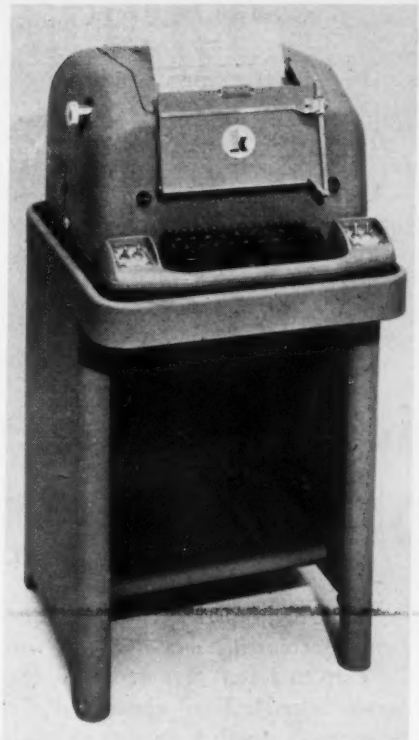
(4) TRANSPORTATION: Truck Dispatching systems can eliminate costly "paper work" by having shipping orders delivered and recorded in one instantaneous operation.

(5) PUBLIC LIBRARIES: Requests for books and information from small communities to neighboring large cities would make a "world of knowledge" available to every citizen.

"Eventually, virtually every major phase of business and industrial operations will involve extensive use of teleprinters," Mr. Kleinschmidt said. "Teleprinters are designed to aid business in everything from inventory and production control to remote operation of automatic business machines."

Drawing on its pioneering experience in the field and an engineering staff of over 100 persons, Kleinschmidt, Inc., is prepared to offer "tailor-made installations and modifications in the machine itself to meet specific needs of users," the company president stated.

The teleprinter provides a system



The Kleinschmidt teleprinter, Model 150, is based on the high speed page printer Kleinschmidt, Inc., designed for military use. Restyled for commercial purposes by elimination of highly specialized features required by the Armed Forces, it contains accessories — such as automatic motor stop, sprocket paper feed, automatic carriage return, and power supply — not included in Model 155. Model 150 is intended for locations with heavy traffic and points far removed from the central switching station.

of communication whereby printed messages can be transmitted simultaneously to any number of similar machines. Receipt of the message is instantaneous with the transmission, regardless of distance from the sender. Each unit is capable of both sending and receiving, and will operate on both wire and radio circuits.

Controlled by a keyboard similar to that on a standard typewriter, it can be operated by anyone able to use a typewriter. Most widely used by news wire services and the telegraph industry, the system is also in operation among railroads, airlines, the petroleum and mining industries, and other businesses where rapid and accurate communications is a major factor.

Two standard versions of the Kleinschmidt page printer are being offered. Model 150 is essentially the Signal Corps unit converted for commercial use by eliminating highly specialized features which were designed for military needs. Model 155 is a further streamlined version

Please Turn To Page 98

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Telefonaktiebolaget L. M. Ericsson of Stockholm, Sweden, and associated companies are manufacturers of all kinds of telephone and signal equipment of every size and for every purpose.

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which provides all features essential for most commercial purposes.

For ultra-rapid transmission, Kleinschmidt is producing a combination typing reperforator and tape transmitter. This machine, Model 120, overcomes the speed limitations of manual typing when used to transmit to a page printer. It also makes practical high speed remote operation of automatic business machines, addressographs, calculators, printing-adding machines, and other mechanical bookkeeping and accounting devices.

All three units have been styled for modern office use by Morton Goldsholl, noted Chicago product and industrial designer. For complete information on the Kleinschmidt Teleprinter, write Kleinschmidt, Inc., Deerfield, Ill.

Plant Committee Stages HELPFUL CONFERENCE

[EDITOR'S NOTE: — The following report of the U-S-I-T-A Plant Conference which was held Oct. 12 at the Conrad Hilton Hotel, Chicago, is concluded from your Nov. FORTNIGHTLY TELEPHONE ENGINEER.

CHAIRMAN C. H. McLean, Chicago, described activities of the U-S-I-T-A Radio Service Committee, and reported several developments of interest to the industry.

The first development, dealt with amending the Communications Act to insure certain exemption from FCC jurisdiction for Independent telephone companies using radio in their operations. U-S-I-T-A has been working on this question for some time and it specifically involves the amendment of Sections 2(b)2 and 221(b) of the Communications Act. The desired amendments as proposed by U-S-I-T-A can best be described in layman language in the following excerpt from testimony given by the Mr. McClean on behalf of the Radio Service Committee before Sub-Committee No. 2 of the House Committee on Interstate & Foreign Commerce on June 26, 1953.

"(1) An Independent company is not fully subject to FCC regulation if it operates exchange or rural lines across a state border. It is desired to give this same service, with radio as a medium instead of wire lines, when this is the best engineering solution, without subjecting the particular company to FCC jurisdiction other than that contemplated in Section 201 to 205 and Section 301 of the Communications Act.

"(2) At the present time an Independent company can own toll wire lines up to a state line or an international boundary and connect at that point with another carrier, without being subject to the jurisdiction of the FCC unless the two carriers involved are considered to be affiliated from a common ownership standpoint. It is the desire of Independent telephone companies to accomplish this same result, where common ownership is not involved, by means of radio instead of wire toll plant, where this is the logical medium, without making the particular company subject to FCC jurisdiction other than that already mentioned.

"(3) As the Communications Act is now interpreted, an Independent company not under jurisdiction of the FCC may operate mobile radio within a state, without affecting its status. However, should an Independent telephone company, providing mobile service, located near a state line or an international border, accept calls from a mobile vehicle beyond the state line or international border, such a company might be held subject to full FCC jurisdiction. As there is a similarity to Paragraph (1) above, in which a small percentage of local lines radiate across the border from an Independent exchange located near the border, it is the firm conviction that the Communications Act should be modified in such a manner as to permit mobile service to vehicles in transit beyond the state in which the company is domiciled, subject to the range of

Please Turn To Page 101

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flotrol automatic
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Model
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24 Amps.
50 Volts

maintains constant battery voltage for all loads

The FLOTROL single-phase charger provides automatic charging without moving parts. Output voltage is maintained constant within ±1% from 10% load to 100% load. Compensation for variation in input voltage is automatic and practically instantaneous.

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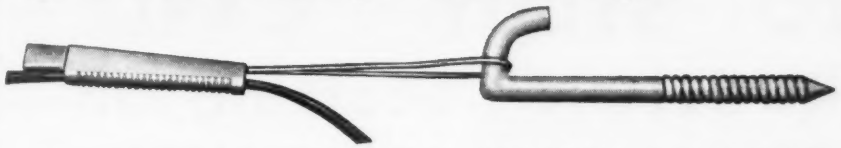

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this *Nicopress* sleeve → plus this *Nicopress* ← 17-2 tool

make better pair splices faster than you've ever made them before!

Pair splices, made the Nicopress way, can't pull out—and they're made in half the usual time!

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This new and up-to-the-minute training course has just been completed for exclusive publication in TELEPHONE ENGINEER & MANAGEMENT by Mr. John S. Reed, one of the industry's leading telephone engineers. The course has been written in easy-to-understand language. It is profusely illustrated with drawings and illustrations. It thoroughly covers all phases of cable construction from a comparison of the merits of Cable Plant versus Open-Wire Plant right through making the original plans, building the Cable Plant together with instructions on maintenance of the plant after it has been completed. This course should prove valuable to old time cable men as well as to men just entering this phase of the business. It will serve as a valuable reference book encompassing the latest and most efficient manner in cable construction and maintenance . . . and prove most useful for companies desiring to conduct training courses among present employees.

CONTENTS

A. DESIGN OF CABLE PLANT
Cable Plant Versus Open-Wire Plant
Cable Studies
House Count Man
Fundamental Feed Plan
Terminal Count
Cable Relief Methods

B. CABLE RECORDS AND MAPS
Purpose of Cable Records and Maps
Types of Records Used
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C. GENERAL CABLE DATA
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D. AERIAL CABLE CONSTRUCTION—Preliminary Work
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Placing Messenger Strand

E. AERIAL CABLE CONSTRUCTION—Cable Lashing Methods
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F. DESIGN AND CONSTRUCTION OF UNDERGROUND PLANT
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Duct Construction
Digging the Trench
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Manhole Construction
Service Box Construction

G. CABLE SPLICING
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Cable Trucks
Setting Up Equipment for Splicing Cable
Removing Sheath for Splicing
Boiling Out Cable Core—Using Dessicant
Splicing the Cable Pairs—Types of Splices
Wiping the Splices

H. LOCATING TROUBLE IN CABLE
Using Cable Breakdown Set
Tracing Trouble With Tone Generator and Amplifier
Other Trouble Location Methods (Wheatstone Bridge, Nitrogen Gas, etc.)

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Sources of Cable Plant
Methods of Protecting Cable
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Plant Conference

Continued From Page 98

the equipment in the moving vehicle."

Mr. McLean reported the FCC was in agreement with the intent of the proposed modification but took exception to the legal wording put forward by U-S-I-T-A to accomplish this result. Subsequently, wording judged suitable by all concerned was reached and on July 30th the Bill fostered by U-S-I-T-A to amend Section 2(b)2 and 221(b) of the Communications Act passed the House of Representatives and is expected to pass the Senate when Congress reconvenes.

Explaining that the availability of many more television channels has brought about the demand for the extension of television network operations to the less populated areas and some of these projects are located in operating areas of Independent telephone companies, Mr. McLean said the following considerations are important from the standpoint of the Independent telephone industry:

(1) There is a tendency at present in projects that the committee knows of, for Independents to be somewhat hesitant to participate in serving television stations located in Independent areas. The cost of setting up the tributary projects tends to discourage participation, particularly when the project is set up to include costly long-haul TD-2 microwave network equipment and in some cases, very short spacing of repeater points, thus locating at least one expensive tower in the Independent's area.

In some cases a direct hop to the remotely located television station studio, thus by-passing the town and main telephone office, has been proposed as an expediency to provide service quickly. This of course makes it difficult to drop off message circuits that may be contemplated in the future on the same facilities, and also renders it practically impossible for the local telephone company to conveniently supply the necessary monitoring facilities—including personnel—required. This is a feature that might well be carried out by the normal maintenance personnel of the telephone company in most instances, at little, if any, extra cost to the company, and this service is covered by a $500.00 monthly charge in the Bell System.

(2) Although it is understood that approved television equipment of independent manufacture can be used for tributary television network extensions, TD-2 facilities currently used throughout the Bell System probably will be recommended by the connecting company and this may be in contemplation of a future extension of the television leg and message circuits, to another point beyond the first television station established in the Independent area. The implication here is that if the Independent provided the facilities to the television station initially established in its area, and later extended these tributary facilities to reach another point in the Independent area or to another company area, if it proved the shortest and best route for providing service, there would be a substantial pro-rate of rental accruing to the Independent telephone company; consequently this eventuality should also be considered in plans for a tributary television project.

(3) The most important point of interest to the Independent telephone company when considering future toll circuit operation, is the fact that the Bell System apparently finds it advantageous for the television network to carry message channels over routes owned by the Bell System and there is no apparent reason why this should not also be true in the case of the branch or tributary routes serving Independent areas. Pursuing this point further, if the Independent telephone company undertakes the tributary construction on a microwave basis to a television station located in the Independent's area at a definite division of line haul, there is no reason why the same, or basically the same, tariff provision should not prevail for message circuits that might be provided by this same medium.

"Capitol cost considerations," Mr. McLean said, "may be the main obstacle in preventing Independent telephone companies from active participation in providing television network facilities and message circuits that may later be derived. As with

Please Turn To Page 102

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Safe equipment in times of emergency to carry the extra load

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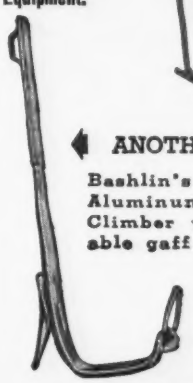

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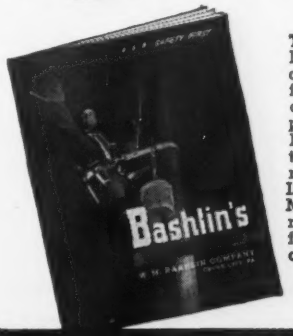
Bashlin's ALCOA alloy Aluminun Adjustable Climber with Removable gaff.

Self-locking screws assemble precision machined parts.



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INDIANA
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MUNCIE, INDIANA

Plant Conference

Continued From Page 101

every new development, first costs are high; consequently consideration should be given to interim ways of carrying out the project at lower initial costs, for it may well be that the eventual capital costs and requiremens of the final project may be considerably changed. This is particularly true for extensions to locations at the end of the line, so to speak, from the standpoint of further extension."

Mr. McLean stated that Independents should be vitally interested both for the present and for the future, in participating in the development of this new flexible medium that is immediately necessary to extend television channels and which may eventually include message circuits or other facilities more readily provided by this means.

Discussing community television systems, Mr. McLean said that due to the capital outlay involved and the questionable future of this type of business with the gradual extension of television coverage, in addition to the possibilities of state or federal regulation, it would not appear that this is a recommended activity for an Independent telephone company, although there is no reason why an Independent telephone company should not cooperate in rendering this service.

"This could be done," he said, "by providing pole contacts on Independent company poles to responsible community television companies, proposing to operate in Independent areas. It would appear that an Independent could supply pole contacts based on approved construction and patterned after contact rental arrangements with power companies, although it is felt that such contracts made should be limited to a period of above five years."

Referring to developments in frequency assignments for telephone common carriers, Mr. McLean said the FCC recently assigned a total of six pairs of frequencies in the 454-455 megacycle band and in the 459-460 megacycle band for use by telephone companies in providing land mobile radio telephone service on a primary basis and for point-to-point rural subscribers and short-haul toll on a secondary, or non-interfering basis.

"Although it would be presumptuous to forecast future action of the FCC," he said, "it is the hope that when the Commission's Rules are promulgated the Commission will see fit to authorize the use of these frequencies for rural subscriber and short-haul toll service on a primary basis where the demand does not exist for additional mobile channels.

"There is still hope that some additional telephone common carrier frequencies below 890 megacycles will be made available, although it is apparent that the realm below 132 megacycles is the only possibility in view of the FCC rejection of the Association's petitions in the balance of the useful spectrum below 890 megacycles. In addition, telephone common carriers will have an increasing interest as times goes on, in frequency bands above 890 megacycles and it is to the interest of both telephone companies and telephone manufacturers to further the technique of providing telephone service by means of radio as rapidly as possible, to insure that adequate essential frequencies will be made available to the industry in bands above 890 megacycles on up into the microwave spectrum."—THE END.

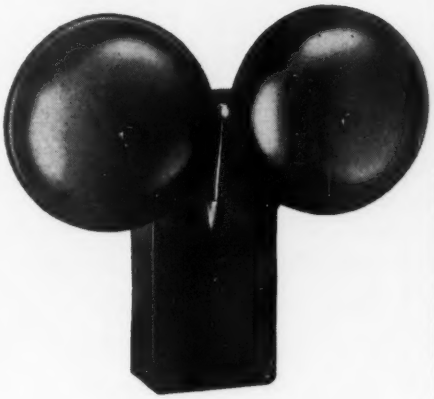
R. S. Perry Elected President of Federal

RAYMOND S. PERRY has been elected president of the Federal Telephone & Radio Co., Clifton, N. J., a division of the International Telephone & Telegraph Corp., according to an announcement made last month. He succeeds Henry C. Roemer, who has been president of Federal since 1951 and who now returns to the IT&T headquarters as vice president in charge of the Administration of the Domestic Division of IT&T.

In assuming the presidency of Federal, Mr. Perry brings to that post wide experience in the fields of electronics and communications. He joined the company in 1949 as general sales manager and since 1951 has, in addition, been vice president and director in charge of all domestic and government sales activities.

As an executive and member of

LET THEM HEAR



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RAYMOND S. PERRY named president of Federal Telephone & Radio Co.

the board of directors of the Olin Industries, East Alton, Ill., Mr. Perry directed the research activity for Western Cartridge, Winchester Repeating Arms and other companies in the Olin group. He also served as a vice president in charge of Engineering and sales for the Ingersoll Milling Machine Co., Rockford, Ill.

Kenneth Eckley Joins Stromberg-Carlson Co.

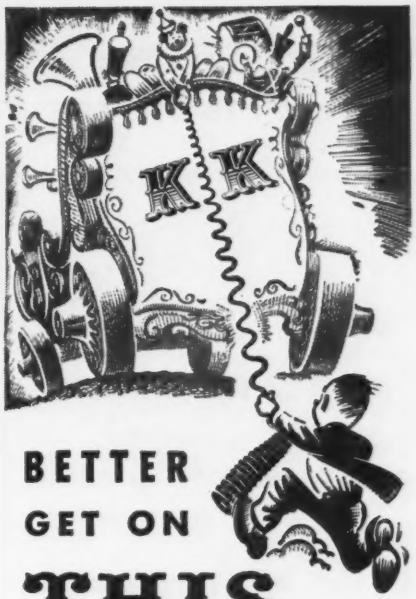
KENNETH G. ECKLEY has recently joined the Stromberg-Carlson Co., Rochester, N. Y., as a sales engineer, according to A. G. Schifino, general manager of the Sound Equipment Division. He will cover the state of Ohio.

Mr. Eckley received his education in his native city of Cleveland, attending public schools and Western Reserve University there, and also the University of Missouri. Before joining Stromberg-Carlson he was associated with the Brodhead Garrett Co., where he spent two years acting as district manager for the states of Indiana and Illinois, and two years in that capacity for the state of New York.

In 1942 he enlisted in the U. S. Navy where his 3½-year service included a tour of duty aboard an L.S.T. in the Mediterranean.

New Bulletin

SOLDERING: An illustrated brochure entitled "The New Way to Solder" is available from the *Wasserlein Mfg. Co., Inc., Joliet, Ill.* This descriptive brochure explains resistance soldering.



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F. E. LEIB

R. C. RIDLEY

Copperweld Steel Makes New Appointments

ANNOUNCEMENT has been made by the Copperweld Steel Co., of the promotion of F. E. Leib to manager of sales of the Wire & Cable Division, Glassport, Pa. He was chief electrical engineer during the last 3½ years. Prior to that, Mr. Leib was assistant manager of sales. He comes to his new position with a background of over 25 years experience in the electrical industry.

Other promotions announced at the same time involve; R. C. Ridley, who was appointed assistant manager of sales; C. C. Sowards who was elevated to eastern sales manager, with headquarters in New York City; and E. G. Elg, who was made western sales manager, with offices in Chicago.

H. J. Billica at San Francisco and L. McGuire at Seattle, continue to function as Pacific district manager and Pacific Northwest district manager respectively.

General Directory Announces Organizational Changes

Effective August 10, the Executive offices of the General Telephone Directory Co., were transferred from Long Beach, Calif., to Des Plaines, Ill. This action resulted in certain organizational changes.

(1) Frank Davies, president of the Directory company will be located at the Des Plaines office. Everett N. Morningstar, vice president and general manager of the Western area, has been elected executive vice president and transferred from Long Beach to Des Plaines. Warren A. Rolph, Western sales manager, has been appointed general sales manager of the company on a national basis and transferred from Long Beach to Des Plaines. Leland J. Mast, assistant vice president in charge of service promotion

Please Turn To Page 110

JOSEPH E. FAGAN, President of Mutual Liquid Gas & Equipment Co., has announced the appointment of WARREN SOUDERS (above) to the company's sales and field staff. After serving Mutual in both manufacturing and sales departments, Mr. Souders is well qualified to assist LP-Gas dealers with any problems relating to industrial applications of LP-Gas. He will travel extensively in the United States with headquarters at the company's main plant in Los Angeles. Mr. Souders is a graduate of Ohio State University. Prior to joining the Mutual Liquid Gas & Equipment Co., he served four years with the Coast Guard

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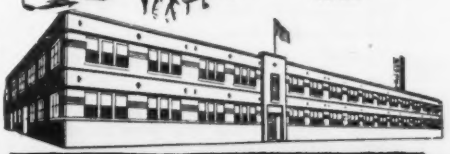
There's a Runzel cord for every type and make of instrument.

Write for your copy of Runzel Telephone Cord Catalog.

Operators too, prefer Runzel Cords.



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For complete information on the products and services described in this department send in the coupon which appears on the opposite page. If you do not see a listing of the products and services that you are interested in, write BUYER'S GUIDE, 7720 N. Sheridan Road, Chicago 26, Ill. The information will be furnished quickly and without charge to telephone industry members.

ADVERTISING, Directories — Planning, Selling, Compiling, Producing, Publishing and Distributing — backed up with over 43 years of Directory Experience and Knowledge. Write or call *L. M. Berry & Co., Hulman Bldg., Dayton, Ohio.*—[ADV. 1]

ADVERTISING, Directories — *General Telephone Directory Co., 604 Pine Ave., Long Beach, Calif., and 1800 Busse Highway, Des Plaines, Ill.*—[ADV. 2]

BELTS — CLIMBERS — COMPLETE LINEMEN'S EQUIPMENT, *W. M. Bashlin Co., Bashlin Bldg., Grove City 1, Pa.*—[ADV. 3]

BELTS — CLIMBERS — PLIERS — SAFETY STRAPS — CONSTRUCTION TOOLS. *Klein & Sons, Mathias. 3200 Belmont Ave., Chicago 18, Ill.*—[ADV. 4]

BOOTHS—Acoustic Telephone — *Sherron Metallic Corp., 1202 Flushing Ave., Brooklyn 6, N. Y.*—[ADV. 5]

BRUSH & WEED KILLERS — *Thompson manufactures many types of brush and weed killers. Write for helpful information on specific problems. Thompson Chemicals Corp., St. Louis 3, Mo.*—[ADV. 6]

CABLE, All Plastic, *Aerial, Duct, Direct Burial, PBX, Switchboard.* — *The Ansonia Wire & Cable Co., Ansonia, Conn.*—[ADV. 7]

CORDS, Switchboard (with or without plugs), Instrument (retractable and regular) and Operators — *Commercial Cord & Supply Co., Inc., 26 Main St., Clifton Springs, N. Y.* —[ADV. 8]

CORDS, Switchboard & Telephone — *Runzel Cord & Wire Co., 4727-31 Montrose Ave., Chicago 41, Ill.*—[ADV. 9]

ELECTRIC HOT WATER HEATERS. *Thermostatically controlled for any hot water heater, Vulcan Electric Co., Danvers 17, Mass.*—[ADV. 10]

ENGINEER, CONSULTING — *Telephone financing — J. E. Albert, 185 N. Wabash Ave., Chicago 1, Ill.*—[ADV. 11]

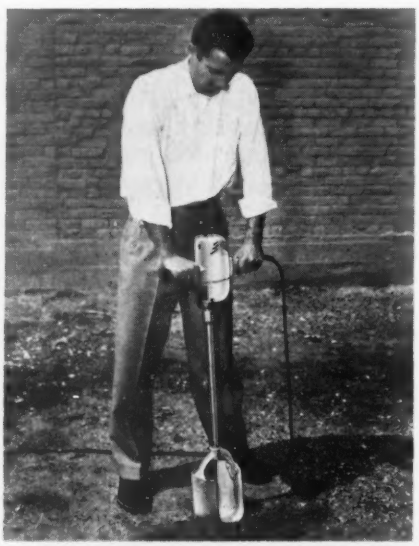
FURNACES — For quickly and economically melting lead and paraffin — *Mutual Liquid Gas Equipment Co., Inc., 3600 W. Imperial Highway, Los Angeles, Calif.*—[ADV. 12]

INSULATORS, Porcelain — *Porcelain Products Inc., Box 300, Findlay, Ohio.*—[ADV. 13]

LIGHTWEIGHT PULLERS — *Coffing Hoist Company, 800 Walters St., Danville 5, Ill.*—[ADV. 14]

PIPE PUSHERS — *Giant Manufacturing Co., South 6th St., at 12th Ave., Council Bluffs, Iowa.*—[ADV. 15]

POLE HOLE DIGGERS — *For derrick mounted trucks. Tele-E-Lect Products, Inc., 9613 Minnetonka Blvd., Minneapolis 16, Minn.* —[ADV. 16]



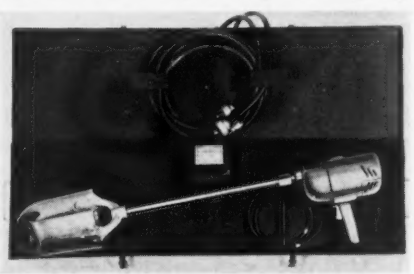
DIGGER:—It gets easier and easier — and less expensive — to dig holes!

Now there's the Super Hole-A-Matic digger and tunneler made by the manufacturers of the Super Hole-A-Minit digger.

According to the manufacturer, the Super Hole-A-Matic fills the demand for a complete, self-powered, portable, one-man operated digger and tunneling machine. Tool digs a hole — at any angle — four to eight inches in diameter up to three feet deep, in just one minute. With shaft extension, it will dig holes up to six feet deep.

Safe and easy to handle, the Super Hole-A-Matic operates in any remote location from a 1.25 KW (or more) AC or DC generator, and can dig six feet deep or tunnel 12 feet by use of the special shaft extension. The manufacturer states the digger will not bend, break or throw the operator when obstructions are encountered; instead, it chews up the softer shale, rides above large rocks without damage. The pulverizing, grinding action of the Super Hole-A-Matic accounts for its ease of operation.

The power unit has grease-sealed ball bearings and extra heavy windings for long, rugged use. It operates on a 115 Volt DC or AC (60 cycles or less) power source.



Boring head and shaft are made of forged, cast and machined parts of tough alloy steels, hardened under special heat treatments for durability and long service under the most strenuous conditions.—For Complete Data, Check New Product 572.

POLES, Southern Yellow Pine — *Colfax Lumber & Creosoting Co., Inc., P. O. Box 23, Pineville, La.*—[ADV. 17]

POLES, Southern Yellow Pine — *Taylor Colquitt Company, 290 E. Main St., Spartanburgh, S. C.*—[ADV. 18]

POLES, Southern Yellow Pine — *Texas Creosoting Co., Orange, Texas.*—[ADV. 19]

PROTECTIVE EQUIPMENT — *Reliable Electric Company, 3145 Carroll Avenue, Chicago 12, Ill.*—[ADV. 20]

REBUILT TELEPHONE & SWITCHBOARDS — *Telephone Repair & Supply Company, 1760 Lunt Avenue, Chicago 2, Ill.*—[ADV. 21]

TRUCK BODIES — *Highway Trailer Co., Edgerton, Wisc.*—[ADV. 22]

TRUCK BODIES AND EQUIPMENT — *McCabe Powers Auto Body Co., 5900 N. Broadway, St. Louis 15, Mo.*—[ADV. 23]

WIRE, Insulated — DATED DROP WIRE — Neoprene or Weatherproof — *Alphaduct Wire & Cable Co., Milltown, N. J.*—[ADV. 24]

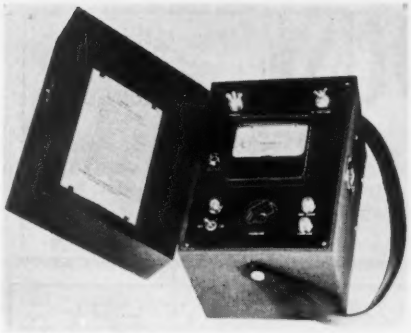
WIRE, Insulated Drop and Bronze or Copperweld — *Acorn Insulated Wire Co., Inc., 36 Freeman St., Pawtucket, R. I.*—[ADV. 25]

WIRE, Telephone, *for all inside and outside uses* — *Whitney Blake Co., New Haven Conn.*—[ADV. 26]

HIGH VOLTAGE PORTABLE TESTER:—A new addition to its line of high voltage testing instruments, which extends the range of output voltage available to 10,000 V.A.C. in a portable type instrument, has been announced by Associated Research, Inc., 3773 W. Belmont Avenue, Chicago 18, Ill.

Designated the Hypot Junior Model #422, this instrument features visual indication of electrical leakage and breakdown, continuously variable voltage output from 0-10,000 volts, and a kilovolt meter connected directly across the high voltage output for accurate indication to + 3% of full scale regardless of load characteristics.

Input is 115 volts 60 cycle A.C. The in-



strument is housed in a steel case 11½" x 8½" x 10" with a removable hinged cover. Net weight is approximately 25 lbs. For complete details on the Model 422 Hypot, Check New Product 573.

MARKING GUN: — Marking trees, marking railroad ties, marking anything with paint, always a messy job and one made slow and costly by tedious chores before and after, as well as during the actual marking process, has been revolutionized by three major improvements introduced by the Nelson Co.,

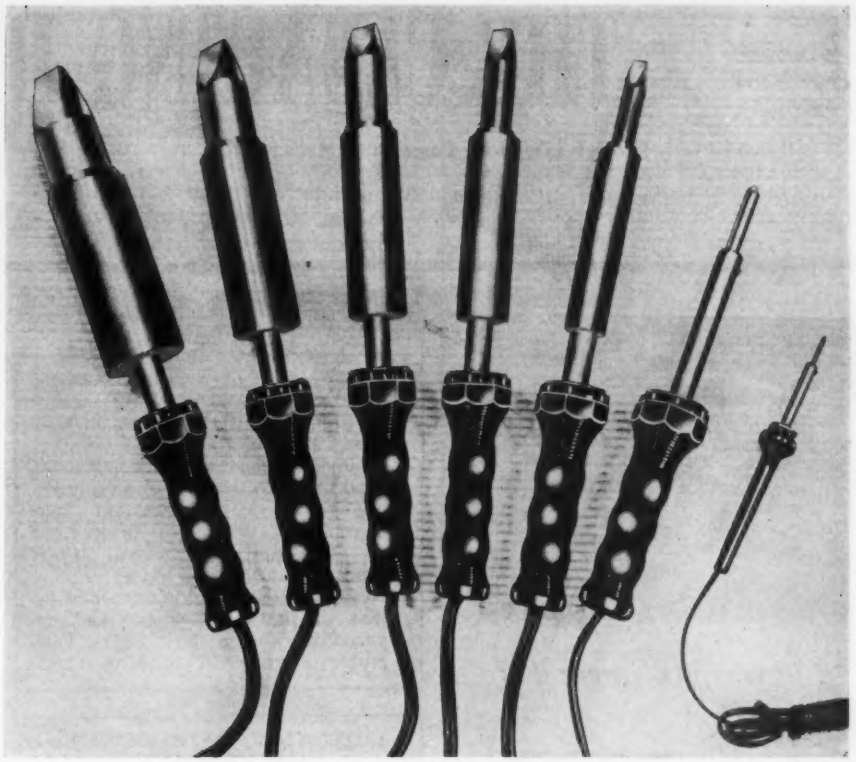
Iron Mountain, Mich., paint and adhesive specialists.

Developed by Nelson chemists in cooperation with professional foresters, the new marking paint does not settle, thicken, or skin over. It thus saves hours of stirring, thinning and straining required by ordinary paint. In addition, it is extremely durable (not absorbed into wood or bark) and highly visable, using the bright pigments of yellow, red, blue, white and orange.

The new NEL-SPOT marking gun has self cleaning features. The nozzle has a protective cap to prevent paint from drying in while the gun is in use. A cleaning wire set in this cap to keep orifice open, a reversible tip to blow out dirt — everything to prevent clogging, keep going and end the "every night" cleaning nuisance.

Third feature of Nelson's marking combination is the disposable paint can. Quart-size, light, easy to carry, you screw Nelson's special non-settling, no-stirring marking paint directly on to the NEL-SPOT marking gun. You just throw away empty cans fast as the paint is used up, and eliminate sloppy funnels canteens, gun cans and all the messy, time-wasting material common to paint marking.

Although developed primarily for marking trees, the new Nelson Paint-Can-Gun combination has obviously useful application in many other fields where paint and paint guns are employed for marking, grading, or establishing sighting points. — For Complete Data, Check New Product 575.



SOLDERING IRONS: — Wall Manufacturing Co., Grove City, Pa., has introduced a new line of industrial electric soldering irons which the company claims will outperform and OUTLAST any other industrial irons.

These new soldering irons were designed for production line use, and engineered to "take production line punishment." For example, an exclusive "Thermostatic Brain" controls heat so perfectly that fusing and tip-burning are eliminated. Iron stays at "on-the-button" production heat all day long, day after day. Thus replacement and maintenance costs are held to a minimum.

The manufacturer claims the Wall irons heat "four times faster than ordinary irons." There is no radionic intereference while irons are in use. The Wall company states the irons are "more economical to use than irons of like wattage because of heat output efficiency."

Irons in this new Wall industrial line range from the smallest to the largest made — suitable for every type of industrial use — from 1-ounce to 1000 watts . . . with thermostatic action up to 2600 watts. Irons operate on 110-120 volts, AC or DC. — for free catalog sheets, Check New Product 574.

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ADV. 16 ____	ADV. 17 ____	ADV. 18 ____	ADV. 19 ____	ADV. 20 ____
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Our doctors still don't know *why*, but if you are a man over 45 you are six times as likely to develop lung cancer as a man of your age twenty years ago. They *do* know, however, that their chances of saving your life could be about *ten times* greater if they could only detect cancer long before you yourself notice any symptom. (Only 1 in every 20 lung cancers is being cured today, largely because most cases progress too far before detected.)

Our new film "The Warning Shadow" will tell you what every man should know about lung cancer. To find where and when you can see this film, and to get life-saving facts about other forms of cancer, phone the American Cancer Society office nearest you or simply write to "Cancer"—in care of your local Post Office.

American Cancer Society

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ATTENTION SALESMEN: Unlimited sales opportunity for aggressive individuals with growing telephone supply house. Telephone experience helpful but not necessary. Very liberal commission. Territories open all over United States. Car Furnished. Telephone & Power Supply, Inc., Topeka, Kansas.

WANTED—Combination men for permanent employment during cutover to automatic, and advancement to switchmen or other responsible positions. Must have adequate experience and references. Immediate employment. Top salaries. Pecos and Northwestern Telephone Company, Pecos, Texas.

LIFETIME OPPORTUNITY—A young expanding telephone supply organization is interested in a general manager and a sales manager. These positions offer far above average possibilities. Our requirements include emphasis on a very strong desire to be successful, an active mind, above average personality and vision. For those who believe they can produce, here are two positions with challenge, opportunity and responsibility. Salary open. TELEPHONE & POWER SUPPLY, INC., 3100 Topeka Avenue, Topeka, Kansas.

WANTED—Man with experience to take charge of all details of conversion to 1600 lines automatic equipment, completion July 1, 1954. Must be capable of supervising cable work, dial installations, installation Central Office equipment, and all details. Age no barrier, depending on ability. Employment one year or permanent, as desired. Pecos and Northwestern Telephone Company, Pecos, Texas.

CABLE SPLICERS, Equipment Installers, Station Installers, Linemen. Experienced men needed. Steady work, good pay. Henkels & McCoy, 6100 N. 20th, Philadelphia, Pennsylvania.

Write Today for Your Copy..

Bashlin's new bulletin giving full details on Linemen's Safety Equipment is ready for you . . . a complete line from which to choose, and every one a champion. Write today!

W. M. BASHLIN CO. **Grove City 1, Pa.**

CABLE-SPLICERS' WIPING CLOTHS

WIPING THE VERTICAL JOINT

Showing the up-right cloth in action.

Formed-flexible finishing cloths (Patented); Flat finishing cloths; Catch cloths; Crotch cloths and Up-right joint catch cloths. Made of world-prize HERRINGBONE TICKING or imported English MOLESKIN. If your jobber cannot supply you write us for literature and prices.

GEO. E. WILLIAMS, Mfr.
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FOR SALE

PINS AND BRACKETS

Manufacturers of all sizes Locust Pins, Oak Brackets, Locust Bushings. REA Approved.

L. H. WIEBEL, INC.

Charlottesville Virginia

Rebuilt, Refinished
Loud ringing bells. 1000 or 2500 Ohm @ $8.00 each. With Condensers @ $9.00 Each.
F.O.B. Chicago, Ill.
INDEPENDENT TELEPHONE REPAIR CO.
2137 W. 21st St.
Chicago 8, Illinois

HOLE DIGGERS

New and Used Highway Earth Boring Machines, both power take-off operated or with integral engine. Also portable diggers with spiral and bucket-type augers. Used line trucks and other used equipment. HIGHWAY EQUIPMENT CO., 2925 N. W. 39th Terrace, Oklahoma City, Oklahoma. Phone WIndsor 2-2147.

ALL SEASON DEHUMIDIFIERS
All temperature, air filtering, humidistat controlled type made in several sizes for unheated dial exchanges in all climates.
Order from jobber or direct.
The H. J. KAUFMAN CO.
13215 Roselawn Ave., Detroit 4, Mich.

FOR SALE — Telephone Exchange. Eighty-six stations. Doubled easily. Sacrifice because of illnes. R. Henry, Crook, Colorado.

LIMITED SUPPLY (Used) SUBCYCLE RINGING MACHINES
Input, 115-V-AC-60 Cy. Output, 20 cycles.
Small PBX Type ..... @ $30.00
Large Type ..... @ $45.00
Prices FOB Chicago, Ill
Independent Telephone Repair Co.
2137 West 21st. St. Chicago 8, Ill.

FOR SALE:—January 1st, 1954. North Automatic Relay Board. Three Hundred lines with all equipment in good working condition. $37,500 worth of equipment. Reason for selling is that we must put in larger board. If interested come look it over and make offer. Mebane Home Telephone Co., Mebane, N. C.

NEW W. E. EQUIPMENT

Sub-Cycle Ringing Generator
Type M7-5 50/60 cycles $45.00
F1AW Handsets with /F1 and HA1 capsules $4.75
G2-3 Handset Hanger $6.00
Telephone Handsets:
Consisting of type 11 Headbands, 2 ea. 716A Receivers, 1 ea. 5 ft. cord complete with a 289B Plug $6.50
7AW Buzzer (270 ohms) $3.00
684 BA Subscriber Sets (Ringer Box) $6.35
7AW Ringer Bell $3.75
Protector Box 1093AW $1.85
4 Cell Battery Case Type 2A $3.00
1657 45G-2 Ground Clamp ..$ .50

Metropolitan Telephone Supply Corp.
254 Navy St. Brooklyn 1, New York

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Reconditioned

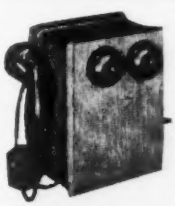
Federal Model "802"

The 802 has "Packaged Part" components that assure on the spot replacement. (Equipped with Type A.E. #24 dials when specified.)

Equipped with capsule type receiver and transmitter, the 802 is available for either automatic or manual service. Complete with new cords.

BUCKEYE
TELEPHONE & SUPPLY CO.
1250 Kinnear Road Columbus 8, Ohio

FOR SALE—150 Magneto Telephones. Many with W. E. Handsets. Write Jim Falls Telephone Company, Jim Falls, Wisconsin.



MAGNETO WALL
3 Bar. 1000 Ohm. @ $18.00
4 or 5 Bar. 1600 or 2500. @ $20
Prices F.O.B. Chicago, Ill.
INDEPENDENT TELEPHONE REPAIR CO.
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SPECIFY **TELERING** for
Dependable and Economical Telephone Ringing Power Equipment.
Engineered for complete satisfaction.
Manufactured by
TELKOR, INC. Elyria, Ohio

ANKOSEAL CABLE

For immediate shipment
6 pair 19 gauge
11 pair 22 gauge
16 pair 22 gauge
26 pair 22 gauge

TELEPHONE LINE WIRE

12-85 Amertel Galvanized Line Wire
per Cwt. $14.45
1500 to 3999 Lbs. ..... per Cwt. $13.18
4000 Lbs. and over ..... per Cwt. $12.97

LOUD RINGING EXTENSION BELLS

"Like New" W. E. Co. type 392 Bells. Vibrant 6" steel gongs, weatherproof black enamel finish. For use outside or inside.
Straight line ..... each $14.00
With Condenser ..... each $14.50

TELEPHONE REPAIR & SUPPLY COMPANY
1760 W. Lunt Ave. Chicago 26, Ill.
Telephone—ROgers Park, 4-3817

Cedar Poles

THE MAC GILLIS & GIBBS CO.
1615 E. Royall Place, Milwaukee 2, Wis.
Northern White and Western Red Cedar
Creosote and Pentachlorophenol Treatments

FOR SALE
Cable Splicer's Trailers
$150.00 each.
Neale Construction Company
3100 Topeka Avenue Topeka, Kansas

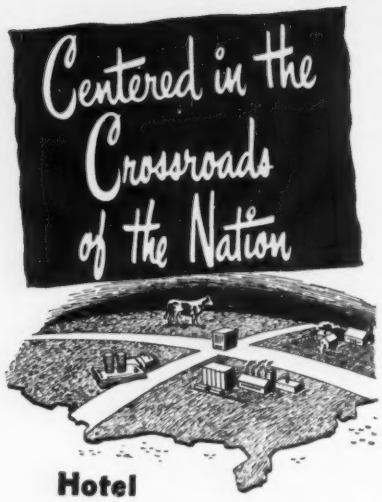
USE TELEPHONE ENGINEER AND MANAGEMENT'S CLEARING HOUSE
To locate workers—jobs—merchandise. A small ad covers the field.

WANTED TO BUY

WANTED: — 25 Battery Feed Repeating Coils. Cuba Telephone Company, Cuba, Missouri.

WANTED TO BUY — A 300 to 400 station telephone exchange located in the south midwest states. Send all information including balance sheet operating statement, price and terms if any. Box 8858, Telephone Engineer Publishing Corporation.

WANTED — Telephone Company for young experienced plant man desiring to get into the independent field. Would consider partnership eventually gaining control. Can furnish best of references. Write Box 8856, Telephone Engineer Publishing Corporation, 7720 Sheridan Road, Chicago 26, Ill.



Hotel
Paxton
OMAHA, NEBRASKA

Traditional host to nation-wide travelers, modern Hotel Paxton stands in the heart of Omaha, the crossroads of the nation. Omaha's newest and finest hotel, the Paxton offers modern air conditioned guest rooms, the smart Pax Room for dining and dancing, the beautiful Mural Lounge for cocktails and for delightful dining the charming Tavern Grill and the tastefully appointed Coffee Shop. For better living in Omaha . . . always pick the Paxton.

AFFILIATED NATIONAL HOTELS

ALABAMA
HOTEL ADMIRAL SEMMES.....Mobile
HOTEL THOMAS JEFFERSON, Birmingham
DISTRICT OF COLUMBIA
HOTEL WASHINGTON.....Washington
INDIANA
HOTEL CLAYPOOL.....Indianapolis
LOUISIANA
JUNG HOTEL.....New Orleans
HOTEL DESOTO.....New Orleans
NEBRASKA
HOTEL PAXTON.....Omaha
NEW MEXICO
HOTEL CLOVIS.....Clovis
SOUTH CAROLINA
HOTEL WADE HAMPTON.....Columbia
TEXAS
HOTEL STEPHEN F. AUSTIN.....Austin
HOTEL EDSON.....Beaumont
HOTEL BROWNWOOD.....Brownwood
HOTEL BAKER.....Dallas
HOTEL TRAVIS.....Dallas
HOTEL CORTEZ.....El Paso
HOTEL BUCCANEER.....Galveston
HOTEL GALVEZ.....Galveston
HOTEL JEAN LAFITTE.....Galveston
CORONADO COURTS.....Galveston
MIRAMAR COURT.....Galveston
HOTEL CAVALIER.....Galveston
HOTEL PLAZA.....Laredo
HOTEL LUBBOCK.....Lubbock
HOTEL FALLS.....Marlin
HOTEL CACTUS.....San Angelo
HOTEL MENGER.....San Antonio
ANGELES COURTS.....San Antonio
VIRGINIA
HOTEL MOUNTAIN LAKE...Mountain Lake
HOTEL MONTICELLO.....Norfolk

AFFILIATED NATIONAL HOTELS

in the Eastern area, will continue in this capacity on a national basis. Warren J. Murphy, sales statistician, has been elected secretary and treasurer and will be transferred from Long Beach to Des Plaines.

(2) Edward T. Jordan, general sales engineer, will succeed Mr. Morningstar as vice president and general manager of the Western Area office, Long Beach, Calif. O. R. Stigall, Southwestern manager, will succeed Mr. Rolph as Western Sales Manager. He will be transferred from Lubbock, Texas to Long Beach, Calif. and report to Mr. Jordan. G. E. Demack, secretary and treasurer has been appointed service promotion and trade mark manager for the Western area.

Donald F. Briggs, unit sales supervisor in Long Beach, will succeed Mr. Stigall as Southwestern manager and will be transferred from Long Beach to San Angelo, Texas. The Southwestern headquarters of the company has been moved from Lubbock to San Angelo.

Paul Rossiter, unit sales supervisor in Long Beach, has been appointed assistant Western Sales manager. N. R. Hatfield, unit sales supervisor in Long Beach, will succeed Mr. Briggs as unit sales supervisor of the Foreign Sales Unit with offices at Huntington Park, Calif.

John Hynes and Max Gudowski, sales representatives in Long Beach succeed Messrs. Rossiter and Hatfield respectively as unit sales supervisors.

T. Gordon Roberts, trade mark and industrial representative, has been appointed unit sales supervisor succeeding Mr. Stayner. Paul Schewe, Southwestern sales manager, will continue in that position with headquarters in San Angelo, Texas. John D. O'Neil, Eastern area accountant, has been elected controller succeeding Charles M. Dorrans, general auditor who has accepted a position with the General Telephone Co. of Calif. Mr. O'Neil will be located in the executive offices, Des Plaines, Ill.

Douglas Redpath, Western Area accountant, has been named chief accountant of that area. He will be located in the Long Beach, Calif. office.

Ray Wilson, Eastern Area cost accountant, has been named chief accountant of that area. He will be located in the Des Plaines office.

Henry Roemer Named IT&T Vice Pres.

HENRY C. ROEMER, president of Federal Telephone & Radio Co. has been designated as vice president in charge of the Administration of the Domestic Divisions of the International Telephone & Telegraph Corp. These divisions are Federal Telephone & Radio Co., Clifton, N. J.; Federal

HENRY C. ROEMER

Telecommunication Laboratories, Nutley, N. J.; Kellogg Switchboard & Supply Co., Chicago, Ill.; Coolerator Co., Duluth, Minn., and Capehart-Farnsworth Co., Fort Wayne, Ind.

Prominent in the development of Federal since 1940, Mr. Roemer directed its activities during World War II. For the past three years he has applied his broad experience in handling the company's operations in producing a wide variety of electronic and communication equipments.

Joining IT&T in 1927, Mr. Roemer was made chief accountant in 1930. From 1933 to 1938 he was in charge of accounting and finance for IT&T manufacturing associates in Great Britain and the continent of Europe and in 1939 he also served in Cuba. He was elected a director of IT&T in 1943, a vice president in 1944 and comptroller in 1946. In 1951, Mr. Roemer became president of Federal.

STROMBERG | CARLSON

transmitter

Published by the makers of famous XY Equipment

VOL. 2, NO. 6 NOVEMBER, 1953

The Stromberg-Carlson 6K Key Telephone System

by Thaddeus Kucharski, Apparatus Engineering

General Description of the System

The new 6K Key Telephone System was designed by Stromberg-Carlson to furnish a means of handling several external lines without the use of switching equipment.

This system provides compact, efficient station equipment with line selection, incoming and busy line visual indication. With this system the subscriber can do the following:

1. Originate and answer calls from one to six central office, PBX, intercommunication or private lines.
2. Hold calls on from one to five central office or PBX lines.
3. Signal on intercommunicating or private lines.

The 6K System provides unrivaled convenient services for business offices, manufacturing plants and the like, where the outside line requirements do not indicate the need for a PBX. This system functions equally well with or without an attendant operator, since any subscriber can answer, originate, hold and transfer calls.

Components of the System

The 6K Key Telephone System consists of key telephone sets with their individual terminal boxes, a distribution box, a relay cabinet, a distribution cable, and a power pack.

Station Apparatus

This system replaces the cumbersome method of providing multi-line service with key boxes, push buttons and ordinary telephones. The "heart" of this system is the "1575" Key Telephone. With the exception of the keys located in the base of this new telephone, the "1575" telephone is similar in appearance to any standard telephone of the "1500" Series. The features mentioned above, or any combination of them, are provided through the use of these keys and common relay equipment.

The maximum number of keys is six; when holding, intercommunication, or signalling keys are desired, the number of line keys is correspondingly reduced. Each line key on the "1575" telephone has its own indicating lamp. The "1575" telephone is fully equipped and wired to handle from one to six lines; unused lines are blocked until needed. Any changes in wiring that may be required are done by changing connections on screw terminals in the terminal box. A few of the possible variations of this telephone are illustrated in booklet T-126, available on request.

Cord connections from the "1575" telephone and cable connections from the distribution box are made in the station terminal box; connections are also made here to the line buzzer mounted in the terminal box.

The Relay Cabinet

The relay cabinet is wired by means of a common cable for five central office lines, and is equipped as ordered. An additional line or lines can be added at any time to the system up to its capacity by adding for each line a relay strip and a terminal strip which are furnished completely assembled and wired. Two screws fasten the relay strip to the frame of the relay cabinet and four screws secure the terminal strip. The common cable is connected to the screw type terminals on the terminal strip. The distribution cable from the relay cabinet is connected to terminals in the distribution box, and from here to all terminal boxes in the system.

The Distribution Cable

This cable consists of 19 twisted pair No. 22 gauge and 2 twisted pair No. 18 gauge color coded conductors with plastic insulation and a gray flameproof saturated braid covering.

The Power Pack

A Lorain RT-1 unit provides 1.5 amperes at 10 volts 60 cycle for the key lamps, 15 milliamperes at 75-95 volts 20 cycle for ringing and .87 amperes at 14-28 volts d.c. for talking.

STROMBERG-CARLSON transmitter

XY Cutover marks another milestone in colorful history of Viroqua, Wisc.

On July 23, 1953, the more than 1700 subscribers of the Viroqua Telephone Company, Viroqua, Wisconsin, began for the first time to enjoy the convenience of a dial system. A Stromberg-Carlson XY dial system, to be exact.

The cutover to XY is the fourth major milestone in this company's endless efforts to improve its service. The Viroqua Telephone Company was founded in 1897 — just three years after the Stromberg-Carlson Company itself had begun to manufacture telephone equipment.

When the telephone company was less than a month old, a 22-year-old farm boy named Bill Lawton went to work as a lineman, maintenance man and emergency operator. That same young man — he's now only 78 — is today secretary-treasurer and manager of that same telephone company.

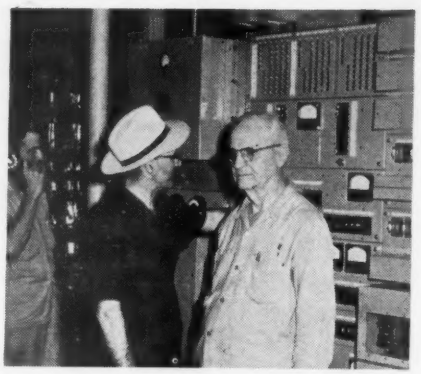
W. E. Lawton can tell you a lot about the years of struggle, the years of progress and the occasional setbacks his company has come through. For instance, there was the very beginning: 46 subscribers, served by a McClure magneto system, with its common copper return wire. Transmission was weak, there was no privacy for the subscriber, but it was a thrill to hear an unseen voice, no matter how weak, in those days. In 1902, the system was changed to a metallic magneto operation, eliminating cross-talk by giving each telephone its own return wire.

He remembers that first big setback in 1907. Fire broke out in the building next door, spread to the telephone exchange and put it out of operation. But fast action by the management brought a new switchboard up from Milwaukee, and service was restored in six days.

The following year the exchange moved into a room in the bank building across the street. They stayed there until 1928, when they built a new building of their own. That latter building, with a second floor added, now houses the company's brand new XY dial equipment.

In 1908 Bill Lawton saw the conversion of Viroqua to common battery operation — milestone No. 3 in its long history.

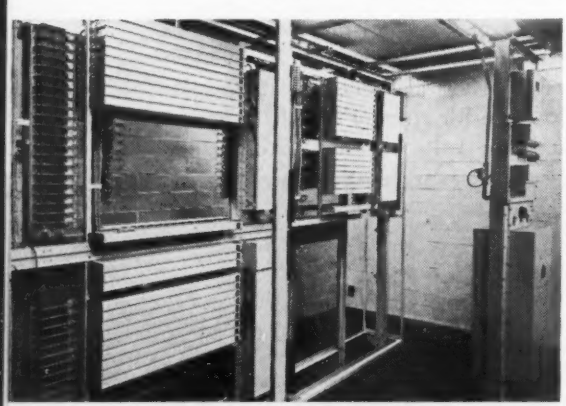
Ice — the enemy of open wire — hit hard in the winter of 1922, putting all but 50 of the company's 800 telephones out of service. Tree limbs, electric lines, and telephone wires came tumbling down under the burden of an inch of ice. The damage was so devastating it took from February to May for the telephone company to recover. They decided then to begin installing underground cables. By 1932, that considerable job was complete.



W. E. Lawton (right) discusses new XY system with Stromberg-Carlson installer Joseph W. Pringle, as H. L. Knudson, plant superintendent, tests operation.

The years after 1932 have seen growth in the area served, leading to the installation of the new XY dial system to accommodate expanding needs.

Officers at Viroqua Telephone Company today are D.B. McIntosh, president, and these directors: Mr. and Mrs. W. E. Lawton, Phil Bigley and Mr. McIntosh.



Kittanning Telephone Co. helps subscriber improve intercommunications with XY-PBX

THIS 120-line XY-PBX system, now in use at the Allegheny-Ludlum Steel Company, Leechburg, Pa., is bringing new speed and efficiency to that company's operation.

The board was installed by the Kittanning Telephone Company, which serves that area. K. B. Schotte, manager of the telephone company, is no stranger to Stromberg-Carlson XY efficiency. Readers of this magazine will remember that his company was the first in the United States to cut over to an XY system, shortly after World War II.

Located in a good-sized territory just north of Pittsburgh, his company serves a rapidly growing area with high industrial potentialities.

This type of attendant's cabinet serves the XY-PBX at Allegheny-Ludlum Steel Co.

STROMBERG-CARLSON transmitter

Postman's Holiday

No. 2 Kansas City to Boulder City, Nevada

Rochester to **Jefferson City, Mo.** — the cordial welcome there of Foster McHenry and the two Kastners — and now we felt very much on our own as we charted our way toward the land of wheat, oil and steaks on the hoof.

The window thermometer in the Kansas City Office showed 105°. Roeg Cushing, Myles Wooley and all the gang made this seem a Stromberg-Carlson island set in a surging sea of commerce and heat waves. The view from the Monument

Roeg Cushing, Myles Woolley and Joe Mullin at Kansas City Branch Office.

is terrific; recovery from the disastrous flood seems complete.

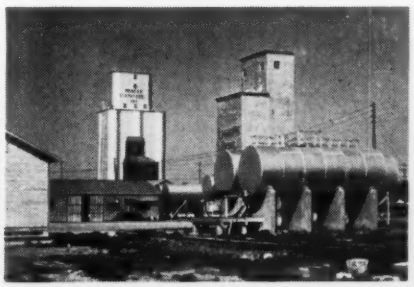
The new road to **Junction City, Kansas,** goes around Fort Riley — the Fegan Brothers' lusty next door neighbor — and lands you right in front of the fine new addition they have built for their XY equipment and toll center. Ernest Larson, leading a fine installation crew, had the situation well in hand. Tom Fegan spoke of the city's history and prospects, especially the increases in toll traffic. He's banking on continuing growth and chose his equipment accordingly. Bob and Mrs. Fegan were most enthusiastic when we saw them at the Convention.

To a New England-born Yankee there is nothing so unaccountable as the flat plains of Kansas, Oklahoma and Texas. This country where you can see ten miles from the back of a horse baffles the eye — (and my camera lens). Grain elevators from afar look like sky scrapers; oil derricks like the gaunt skeletons left by a gigantic forest fire. "Devil Dogs" swirling up from parched earth; lean cattle

Telephone Office at Junction City, Kansas.

being fed "cake" or shipped-in hay. Huge pipelines carrying the black gold north and east.

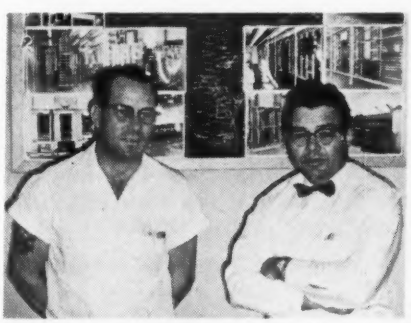
Then suddenly irrigated fields yielding three to five crops a year; when the water stops flowing, the desert takes over again. It's terrifying but even more wonderful, as men now build towns



Black and Yellow Gold — Skyscrapers of the Southwest.

where a few years ago none could live. And most all of it is protected Independent territory.

These first impressions were strongly with me as I called at the **Lubbock, Texas** office of the General Telephone Co. of the Southwest. Gwynn Browell, introducing me around, pointed out how lucky I was to find all the men in one place, as each has been promoted to higher responsibilities in new locations. **J. L. "Dusty" Kemper,** now Western Division Manager, was leaving for Brownfield, Texas (a recent letter speaks of how they enjoy their new home). Among the in-



J. L. Kemper and E. G. Browell, Lufkin, Texas.

teresting experiences he shared was the road moving job where poles — cross arms and wires intact — were lifted by cranes and moved as much as 19 feet without a single cut or service interruption.

E. L. "Bud" Langley, will capably fill a big job as General Equipment Supervisor in the general office. **W. C. "Bill" Gaylor** has the supervision of equipment for the western (Brownfield) division and J. P. Willows directs General Construction from headquarters. Busy as they were — and Saturday at that — all gave that real Texas welcome. What could we do but go right out and purchase Texas hats!

The 60 miles over to Hobbs took us through part of the drought-stricken area publicized this summer. Four years without rain is a long time, and sand creeps up over the doorsills and stands hub-deep around abandoned tractors. But new oil wells come in and — well, look at **Hobbs, New Mexico.**

Mills Roberts, now Northwestern Division Manager with headquarters at Memphis, Texas, certainly showed the pride he feels in the beautiful exchanges at Hobbs and Carlsbad. Even as the streets in Hobbs were first being paved, the telephone Company was leading the

Mills Roberts proudly shows Hobbs, New Mexico, XY.

way in planning for the revolution oil would bring. How right they were! And how glad they are now that their early vision made provision for the continuing growth and prosperity of these two cities. Hobbs is the toll center for all southeast New Mexico; 12,000 stations now — plans in the making for new and larger oil and gas projects in the service area. You just hold your ten-gallon hat and never turn back!

The next thousand miles present a dilemma to the editor who must watch his column inches, and the traveller who sees this awe-inspiring Southwest for the first time. "Billy-the-Kid" country, lava beds, the discouraging search for a turn-off with a tree but minus beer cans, etc., the Navajo capital at Window Rock,

Yes, we're really getting out west now!

Arizona. Camping overnight at Grand Canyon.

From Boulder City — that miraculous Garden of Eden set down full grown in an inferno of desert — we phoned **Hershel Trumbo** in **Henderson, Nevada.**

"Come over as you are — there's a big story here!" So interesting, in fact, that we'll visit Hershel next month.

STROMBERG-CARLSON transmitter

Wraps Lifted for a Quick Look At a Big Job Nearing Completion

Behind every cut-over and the excitement which attend the beginning of a dial service in any community are months of careful, painstaking work by an unsung group of workers — the Installation Crew.

Installation crew at Kingsport, Tenn. Standing at left, Edward Ferguson, Supervisor.

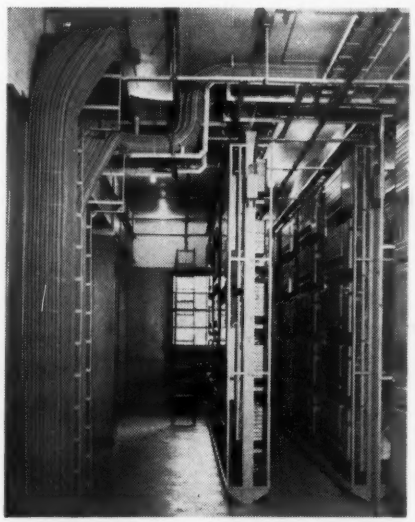
Before long the Inter-Mountain Telephone Company will bring XY Dial service to its subscribers in Kingsport, Tennessee. This event will receive its own publicity in due time. Quietly in the background on the day of conversion will be David Balis, Assistant Chief Installer for Stromberg-Carlson; Edward Ferguson, Supervisor of the installation crew at Kingsport; and certain key workers who have labored to make this day a success.

"Ed" Ferguson has proved his ability on previous large XY conversions — Thomaston, Georgia, and the Inter-toll Network at Tampa, Florida, to mention a couple. Before joining Stromberg-Carlson in 1947, Ed had been a group leader in the installation force of the General Telephone Company of the Southwest.

The work of installation at Kingsport began Dec. 29, 1952, with a small crew to assemble and erect the equipment and distributing frames. When it was possible to use more men effectively, they were brought in, so that during the peak of the job, Ed had eighteen men on the force.

Kingsport is a large office: 6,600 lines and 13,600 terminals. In addition a 24-Position Stromberg-Carlson No. 3 Toll Board has been installed. The work of assembling, running cables, making connections and the multitude of tests simulating every type of operating condition is virtually completed.

While this is primarily a salute to the Installers, a few men intimately associated with the development of this exchange should be mentioned:

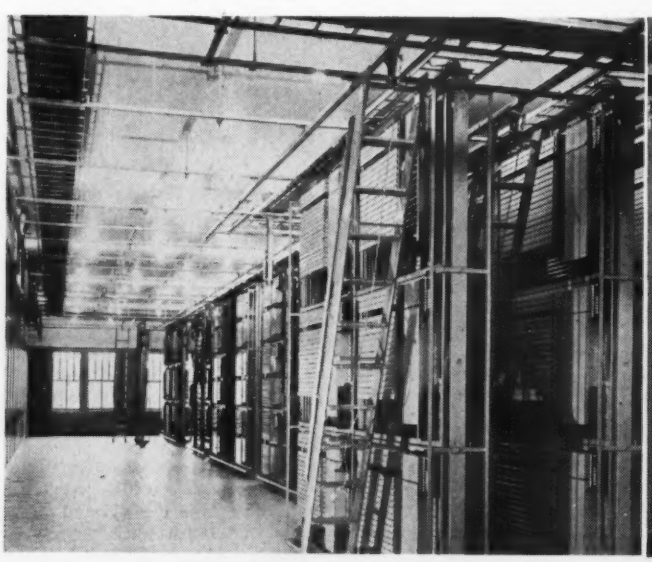


Cables joining 75 connector groups to the main frame on floor below.

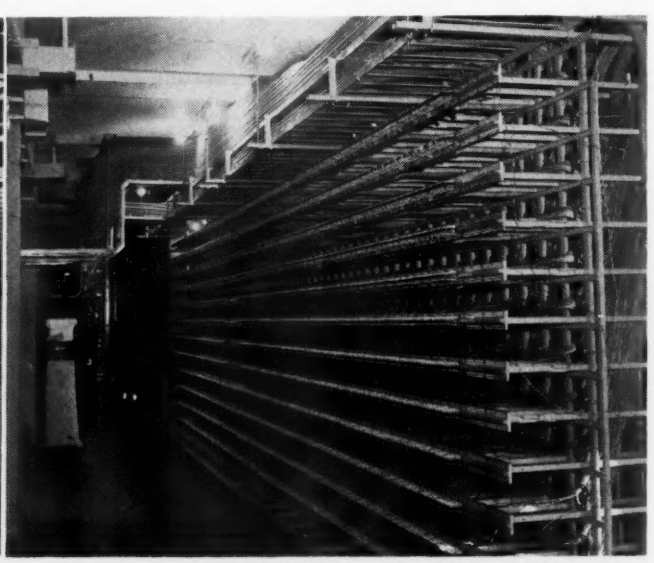
James Hagen, Sales Engineer of the Atlanta Office; John Tegelaar, Project Engineer; Clinton Stowe, Cable and Floor Plan; and Ernest Bleier, Power and Supervisory Equipment — all of the Engineering Department in Rochester.

Stork meets delivery date for Art Beam

Arthur L. Beam, Stromberg-Carlson salesman in the Southeastern States, advises us that he and his wife were blessed with a baby boy, Mitchell Alan, on August 28. Tipping the scales at 7 lbs. 5 oz., the little fellow is the Beams' first child. He was born in Tallahassee.



Line finders (foreground) and selectors (background) in new air-conditioned addition to Kingsport exchange.



Main distributing frame, showing all cables from equipment room on floor above. Loose wires are temporary test leads.

STROMBERG-CARLSON transmitter

MEET J. S. Ottalagana

Joseph Ottalagana is a quiet-spoken man who thoroughly enjoys his work, because, as he says: "It's a challenge to be able to sell the right telephone equipment to somebody." In the National Sales Engineering Department, and as head of the REA Customer Service Department, "Joe" has plenty of opportunity to prove his mettle in the art of selling.

Joe began his career in telephony in 1936 when he first came to Stromberg-Carlson. With a BS in Electrical Engineering from Clarkson College he began in the Drafting Room, rose to the post of Job Engineer and in 1943 was made Responsible Engineer for the Development Laboratory.

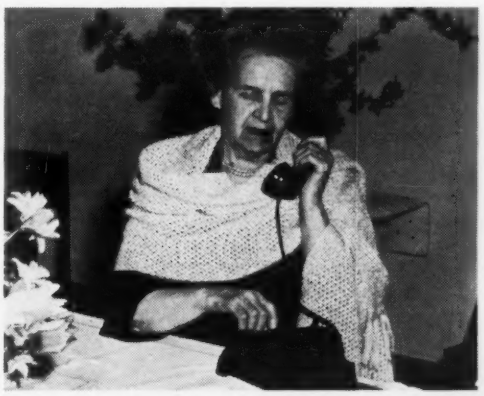
It was at this time that Ben Schotte of Kittanning, (Pa.) Telephone Co. came to Stromberg-Carlson — and Joe Ottalagana — for advice on developing an over-all dial conversion program. Result . . . the first XY System in the United States.

In 1946, Joe became associated with his real love — selling — when he joined the National Sales Engineers. He travelled for a short while in Pennsylvania as a Sales Engineer, gaining some of the valuable experience which he now puts to work serving telephone customers all over the United States.

Married in 1938 to Madeline Morris, the Ottalaganas have three children: Robert, 13; Richard, 10; and Nancy, 5. They all enjoy their home first, with sports and music as close favorites. Joe is very proud of their kitchen, which he just remodeled, and takes a great interest in his clubs: Rochester Engineering Society, AIEE, Clarkson Alumni, and last but not least, the local PTA of which Mrs. Ottalagana is President. Joe also adds his talents to those of the other members of the Stromberg-Carlson Bowling Team — in fact Joe enjoys doing everything!

We Salute . . .

New XY at Silverton, Oregon



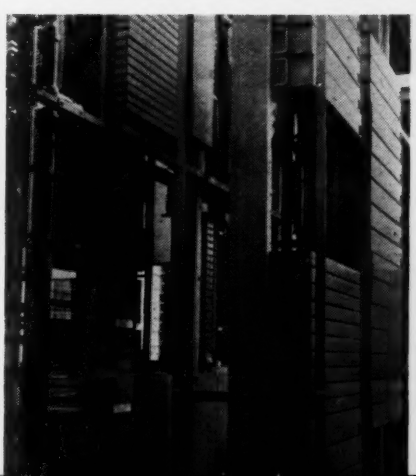
It was a festive occasion on April 18, when the Interurban Telephone company cut over its Silverton, Oregon exchange to XY. Refreshments were served, and the city leaders gathered to observe the change to dial. At left, Mrs. Ethel P. Brown, Business Manager and Secretary of the telephone company, puts through first XY call.

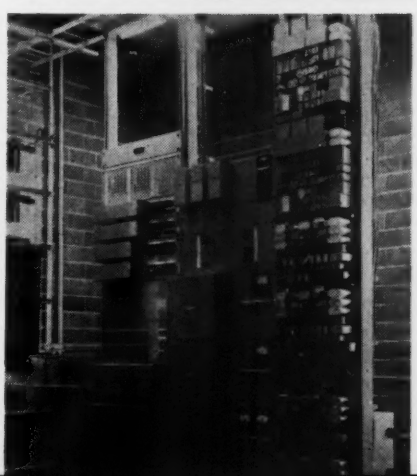
In the XY room at Silverton during cutover ceremonies were (l. to r.) Lowell Brown, President of Interurban Telephone Company, J. P. Galligan, West Coast Manager for Stromberg-Carlson, and Fred McGrady, Stromberg-Carlson representative.

And First Birthday at Blair, Nebraska

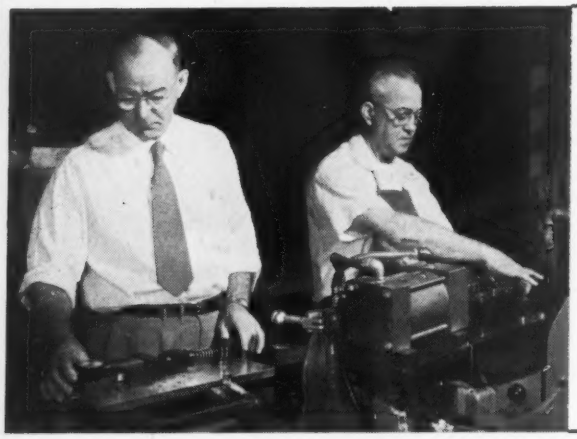
On December 17, the XY system at Blair, Nebraska will be one year old. Robert C. Hunt, owner of the Blair Telephone Company is highly pleased with his system. In the April, 1953 Transmitter you read his own enthusiastic comments about it. Here are a few photographs, taken at random, of the equipment at Blair.

1. *Test turret at Blair, Nebraska*
2. *Relay rack for Stromberg-Carlson toll board in use at Blair*
3. *Power board and Bell toll equipment*





STROMBERG-CARLSON **transmitter**



FACTORY TRIP

When customers repeatedly comment on the smooth, quiet operation of your telephone dial or the perfect alignment of the XY Switch wipers after years of service, John Conners and the men and women in his Machine Department can be proud of a job well done.

John Conners (left), foreman, checks relay armature frames with a length gage after broaching operation by old-time employee Albert Young.

Mary Flynn, senior woman operator with 30 years service, taps the die-cast front of telephone dials.

New machines — bigger, faster and more accurate — have been added. This accuracy is extremely important today when many of the dial telephone systems are planned as unattended exchanges. Operating companies have to rely on the manufacturer to supply parts which were *made right* and will last.

Machines alone cannot do the job; skill and experience have an equally important place. And from the experienced workers come new ideas on how to improve techniques. For instance, Edward Kozlowski (13 years in this department) and Raymond Carbone, also a technician with many years of service here, were instrumental in developing techniques for obtaining the close tolerances required by the Cog Roller of the XY Switch.

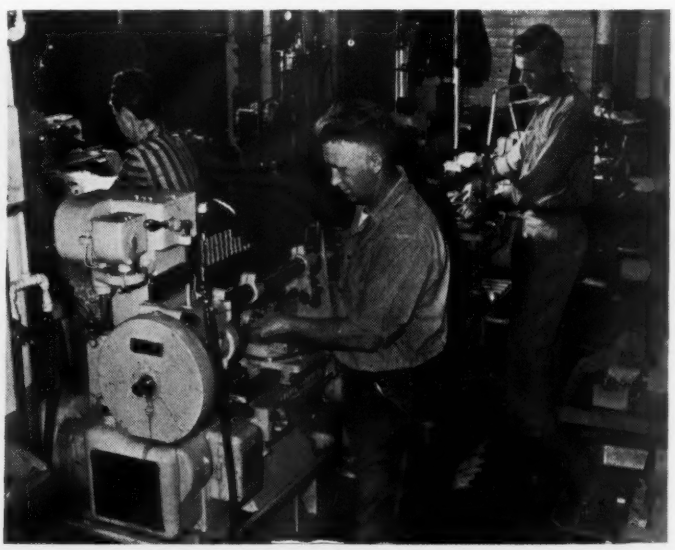
Years of experience have taught workers like Tessie Croft (28 years) and William McVea (18 years) that designs will change — even entirely new concepts of telephone theory — but nothing replaces the necessity for care and accuracy in drilling, tapping, hobbing, milling or broaching of basic parts.

Spot welding has replaced the high speed hammer in many applications: for instance the carriage of the XY Switch. This makes a stronger unit, to withstand the wear as the carriage follows dial pulses forward, into the switch bank and home again with unbelievable speed.

John Conners has been Foreman of the department for the last 10 years. He started in 1923 in the Switchboard Frame department, and still has overall supervision there. With the increase in demands upon John's time, Ralph Gaudioso, formerly head set-up man, has been made Assistant Foreman.

Edith Marlow mills the back of XY Switch cell banks to required flatness for proper contact between wipers and wire banks.

Genevieve Finley shaves small gears; William McVea cuts small gears for XY Switches; Edward Kozlowski hobs cog roller of XY Switch.



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THE BACK OF THE BOOK

BY JOHN G. REYNOLDS

RED OUTDOOR BOOTHS

WHY IS RED becoming more popular as the color for the nation's growing number of outdoor telephone booths? The *Des Moines Register* recently offered an answer: Red came into favor after a color blind painter got his orders mixed and painted a booth red instead of green. Before his mistake could be corrected, the business from that booth suddenly zoomed in call volume. Other booths, according to the newspaper, were painted red and similar increases came. We're purposely not checking this item with the outdoor booth specialists. We're a bit afraid the newspaper might have been over-optimistic on the business-getting value of red. But right or wrong, it's a good story.

"IF A CAT ANSWERS"

IS THERE A CHARGE on a long distance call if a cat answers the telephone? This question popped up recently when a Washington, D. C. lady telephoned her husband in New York. He was out. When the telephone rang, the family cat jumped up, pushed the telephone out of its holder and meowed what we'd guess was a catty "hello." The lady found she had a charge for the call on her telephone bill and when she finished explaining, the telephone business office folks were glad to tell her it didn't belong there. The cat has been cautioned about taking over on affairs that really don't concern it.

GREETINGS FROM THE AURORA'S

IN AN UNPRECEDENTED gesture of international friendship, civic leaders and officials of Aurora, Ill., assisted in dedicating the new dial telephone system of Aurora, Canada last month.

As Canadian Counsel Arthur F. Broadbridge looked on, Mayor Paul Egan, E. J. Rayn, commissioner of public health and safety, Peter A. Lies, past president of the Lions Club, R. E. Fensterbusch, manager of the Chamber of Commerce and several other citizens joined in expressing best wishes on the Canadian city's change over to dial service.

Illinois Bell Manager W. N. Hollister also congratulated his Canadian colleague, C. E. Blosdale, on the significant advance made by his company in providing the best telephone service possible.

The international call came thru at 10:58 P. M. on Mayor Egan's desk in the city hall. On the Canadian end was Mayor Crawford Rose, making the first long distance call ever placed on the new dial equipment in the Canadian city. Only a few seconds before the Canadian city's 1,600 telephones had "gone dial."

Consul Broadbridge concluded the conversation by remarking on the significance of the international hookup in cementing closer relations between Canada and the United States . . .

TRAINS BEGIN PAY PHONE SERVICE

WANT TO telephone from a train to continue your goodbyes or to have the gas shut-off? You now can do it out of Chicago via short-wave radio.

The Pennsylvania R. R. began this service last month on its Broadway Limited to New York. The pay telephones in two cars work as far as Gary. Beyond there to Harrisburg, Pa., the service is experimental. The Broadway previously has had telephone service between New York and Pittsburgh.

The New York Central System announced that four telephones on the 20th Century Limited were working out of Chicago. The Century has had a telephone in service between Buffalo and New York City since 1948.

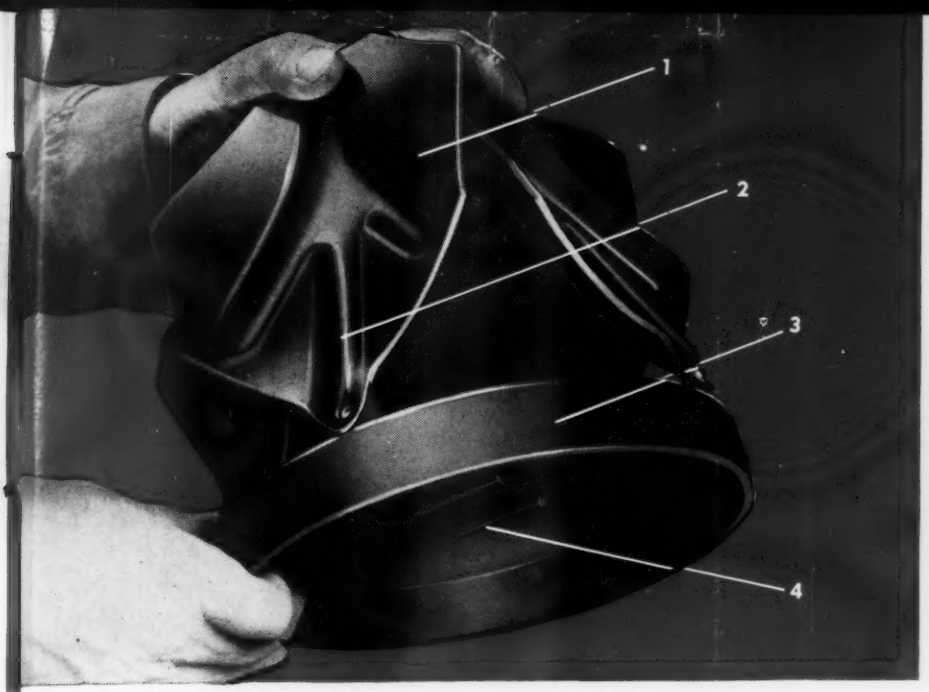
PUZZLES BY TELEPHONE

BORED Viennese telephone subscribers have a new way of killing time: They *dial for a puzzle.*

They hear a new puzzle over the telephone every second day and the service costs the same as an ordinary call.

At the end of each month, prizes are given for the 15 correct answers.

The Vienna telephone exchange now furnishes fairy tales for children, in addition to weather forecasts, reports on road conditions and football match results.



Heavy, shovel-shaped blades (1) slide into the earth with minimum disturbance. Ribs (2) on the underside stiffen the blades and cut friction against base. Heavy domed base plate (3) with deep skirt for strength. Nut retainer channel section (4) welded to the underside of base keeps the rod from pulling the nut through the base.

Note the large, square tamping area (5) and the wide hinged sections (6) which keep the blades from twisting if a stone is encountered while the anchor is being expanded. "Ears" (7) inside the center of gravity of two opposed blades give additional area for holding power, better balance. (8) "Projected Area," as L-M figures it, is the area of the *shadow* cast by the expanded anchor, not the total surface area of the plates including vertical sides of ribs as usually figured.

Tests Show L-M Anchors Have High Strength, Minimum Creep

The value of an anchor depends both on its inherent strength, and on its ability to resist creep. You can realize the importance of creep better if you take an actual example. Let us suppose a line built with 35-foot poles at 200-foot span, and 8-inch sag. If an anchor guyed at 60 degrees had a 4-inch creep, the resulting sag would be 86 inches! No wonder utility men are cautious about creep!

Design Based on Extensive Tests

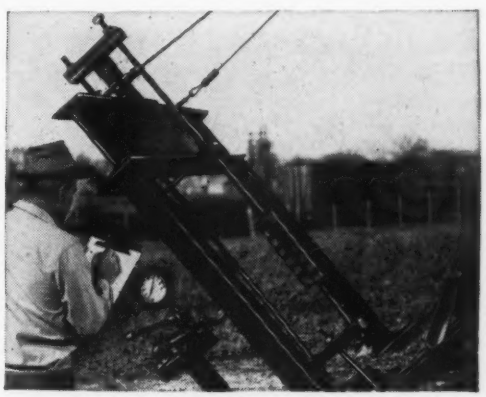
The design of L-M 4-way expanding anchors is based on a very extensive series of pull tests. As shown in the small photo, anchors were buried, and pulled with a hydraulic lift, till the anchors gave or the rods broke. One after another, weak points were eliminated, and the anchor was redesigned to cut creepage.

The features shown in the illustrations are the result of this test program. We feel this L-M anchor is the finest you can get. It assures the greatest strength with minimum creepage.

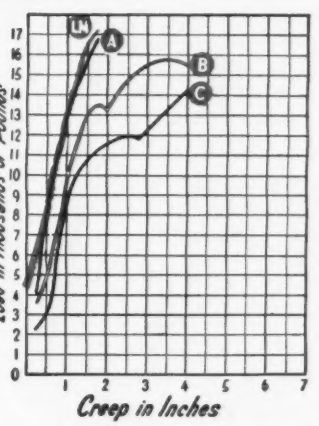
The four blades are formed of a single piece of steel, shaped, and held to the base by four small bolts that shear off easily by tamping.

Ask the L-M Field Engineer

For catalog information and samples if you wish, ask the L-M Field Engineer who calls on you; or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division). 116-R



Pull Test Equipment: Hydraulic lift on U-shaped steel frame with pump and pressure gauge for recording the pounds of pull applied to anchor rod. Tests were made both at vertical and at 45 degree angles.



In tests with 3 comparable anchors the L-M-designed anchors held creepage to a minimum, even at loads of 17,000 pounds.

Available in 3 Sizes

Catalog Number	Diameter—Closed—Inches	Expanded Area—Square Inches	Nominal Holding Power Class—Pounds	Anchor Rod Diameter—Inches	Minimum Mechanical Strengths Without Noticeable Deformation—Pounds
200026B1	8	110	6,000	⅝, ¾	16,000
200026B2	8	125	8,000	⅝, ¾	21,000
200026B3	8	132	10,000	1	24,000
200026B4	8	132	10,000	⅝, ¾	24,000

All 3 sizes are REA-approved, and have been thoroughly tested by both L-M and by utility companies. You can depend on them to hold!

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Because of our vast experience in publishing telephone directories for over 4,400 communities, we can substantially increase your net profit from directory operations. We'll do the spadework... and you'll make *more* profit! Telephone or write, today.

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